REPRESENTATIVE QUESTIONS OF TEST PAPER

PART (A) (GENERAL PART)

Mathematics

Q.1. $y = \ln(x)/4$ is solution of the differential equation

(A) $\frac{dy}{dx} = e^{4x}$ (B) $\frac{d^2y}{dx^2} + \frac{dy}{dx} = 4$ (C) $4\frac{dy}{dx} = \frac{1}{x}$ (D) none of A,B,C.

Q.2. The differential equation representing the family of curves $xy = c$ is:

(A) $\frac{dy}{dx} = 1$ (B) $\frac{dy}{dx} = \frac{-1}{x}$ (C) $\frac{dy}{dx} = \frac{-y}{x}$ (D) $\frac{dy}{dx} = \frac{-x}{y}$

Q.3. Which of the following is correct?

(A) $\bar{a}\times(\bar{b}+\bar{c}) = (\bar{a}\times\bar{c})+(\bar{b}+\bar{c})$ (B) $\bar{a}\times(\bar{b}+\bar{c}) = (\bar{a}\times\bar{b})\bar{c}+(\bar{a}\times\bar{c})\bar{b}$

(C) $\bar{a}\times(\bar{b}+\bar{c}) = (\bar{a}\times\bar{b})+(\bar{a}\times\bar{c})$ (D) $\bar{a}\times(\bar{b}+\bar{c}) = (\bar{a}+\bar{b})\times\bar{c}$.

And so on

Physics

Q.1. The average distance from the sun to the earth is approximately 93 million miles. The approximate speed (km per second) of the earth in its orbit around the sun is closest to :

(A) 5 (B) 10 (C) 20 (D) 30

Q.2. A wheel is revolving at a steady rate of 120 rev/min., its angular velocity in radians per second is then closest to :

(A) 2π (B) 4π (C) 6π (D) 8π

Q.3. Power consumed by two 100 W bulbs in series supplied with 220 volts ac will be:

(A) 200 W (B) 100 W (C) 50 W (D) 25 W

And so on

English

Questions: 1 – 3

The Richter scale is a numerical logarithmic scale developed and introduced by Charles R. Richter in 1935 to measure the amplitude of the largest trace recorded by a standard seismograph one hundred kilometers from the epicenter of an earthquake. Tables have been formulated to demonstrate the magnitude of any earthquake from any seismograph. For example, for a one-unit increase in magnitude, there is an increase of times thirty in released energy. The Richter scale considers earthquake of 6.75 as great and 7.0 to 7.75 as major. An earthquake that reads 4 to 5.5 would be expected to cause localized damage, and those of magnitude 2 may be felt. It is estimated that almost one million earthquakes occur each year, but most of them are so minor that they pass unnoticed.

Q.1 What does this passage mainly discuss?

(A) Charles F. Richter (B) Seismography (C) Earthquakes (D) The Richter scale

Q.2 According to the information in the passage, what does Richter scale record?

(A) History (B) Biography (C) Geology (D) Mathematics

Q.3 According to the Richter scale, which of the following numbers would indicate that there had probably been damage to the immediate area only?

(A) The distance from the epicenter (C) The degree of damage

(B) The amplitude of the largest trace (D) The location of the epicenter

And so on

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REPRESENTATIVE QUESTIONS OF TEST PAPER

PART (B) (SUBJECT PART)

Physics

Q.1 Which of the following has an upper limit of $\lambda = 18760\overset{o}{A}$ for hydrogen spectral series?

(A) Balmer series (B) Lyman series (C) Brackett series (D) Paschen series

Q.2 If h = 6.63×10^{-34} J-s, e = 1.6×10^{-19} C, then uncertainty in the energy of a photon which is emitted from an atom in approximately 0.01 microsecond is

(A) $6.4\times10^{-19}\,ergs$ (B) All of the others (C) $4\times10^{-7}\,ev$ (D) $6.4\times10^{-26}\,J$

Q.3 Which of the following could not be explained on wave nature of radiation?

(A) interference of light (c) polarization of electromagnetic

(B) diffraction of light (D) photoelectric emission

And so on

Chemistry

Q.1. Which of the following statements is correct about chemical equilibrium ?

(A) At equilibrium no more reactants are transformed into products

(B) At equilibrium the rate constant for the forward and reverse reaction are equal

(C) At equilibrium there are equal amounts of reactants and products

(D) At equilibrium the forward and reverse rates are equal

Q.2 How many atoms of oxygen are present in 5.6 liters of SO_2?

(A) ¼ $\cdot 6.02\times10^{23}$ (B) ½ $\cdot 6.02\times10^{23}$ (C) 1.0 $\cdot 6.02\times10^{23}$ (D) 2.0 $\cdot 6.02\times10^{23}$

Q.3 Molecules of an ideal gas exert a force on the container walls due to

(A) Surface tension of the gas

(B) Cohesion between molecules of gas & its container wall

(C) Gravitational repulsion at the wall

(D) Collision between molecules of the gas & its container wall

And so on

Mechanical

Q.1 An inclined plane is often used to assist in lifting heavy objects. This is done since the:

(A) Force is reduced (B) Work is reduced

(C) Potential energy is increased (D) Weight is increased

Q.2 For a mass suspended by a spring, at maximum displacement (k = spring constant, a is displacement amplitude)

(A) Kinetic energy is zero, potential energy is $kA^2/2$

(B) Potential energy is zero, kinetic energy is $kA^2/2$

(C) Both kinetic & potential energy contribute equally to give a total energy of $kA^2/2$

(D) Potential energy is less than kinetic energy

Q.3 For a gas that is allowed to expand reversibly and adiabatically there is no change in

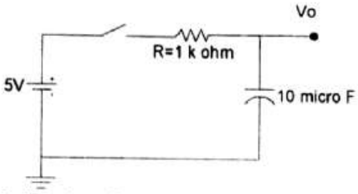
(A) Internal energy (B) Temperature (C) Entropy (D) Both a and b

And so on

REPRESENTATIVE QUESTIONS OF TEST PAPER

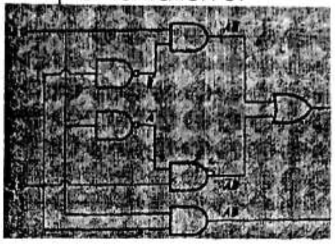
Electrical Engineering with Specialization in Electronics

Q.1 If the capacitor C is initially charged to 2 V in the following figure the value of output voltage after 2ms of closing of switch is:



(A) 3 V
(B) 2.5 V
(C) 1.5 V
(D) 4.5 V

Q.2 The digital logic circuit shown in the following figure is an implementation of



(A) Two input multiplier
(B) A false circuit
(C) Two input Subtractor
(D) Two input adder

Q.3 The effect of the negative feedback on an amplifier is to
(A) increase gain (B) make the amplifier oscillate
(C) improved stability (D) both (A) and (C)

And so on

Electrical Engineering with Specialization in Electrical Power

Q.1. A filtered full-wave rectifier voltage has a smaller ripple than does a half-wave rectifier voltage for the same load resistance and capacitor values because:

A. there is a shorter time between peaks,
B. there is a longer time between peaks,
C. the larger the ripple, the better the filtering action,
D. none of the above

Q.2. In a balanced 3-phase load, how many Wattmeters are sufficient to measure the total instantaneous power continuously?

A. 1 B. 2 C. 3 D. 4

Q.3. A 3-phase oil circuit breaker is rated at 1200A, 1500MVA, 33KV, 3Sec. The RMS breaking current would be

A. 20.25A B. 20.25kA C. 26.25A D. 26.25kA

And So On

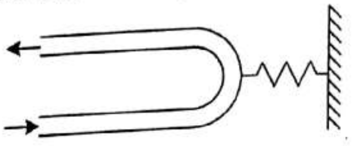
Chemical

Q.1. A 10 cm diameter spherical steel ball at 80°C is suddenly quenched in a large bucket of water at 20°C. If the average heat transfer coefficient is 10 W/m^2-s, the initial cooling rate of ball is closest to:
(A) 18.8 W (B) 6.3 W (C) 4.7 W (D) Can not be calculated from this data

Q.2. A gas phase reaction takes place on the surface of a cylindrical catalyst particle. If the process is controlled by the diffusion of reactants on the catalyst surface than by doubling the catalyst surface area the rate of reaction will be:
(A) Doubled (B) Increased 4 times (C) Reduced by Half (D) Unchanged

REPRESENTATIVE QUESTIONS OF TEST PAPER

Q.3. Water flows in a 3 cm ID U-bend pipe with a flow rate of 0.5 kg/s as shown below. The force in the spring will be:



(A) 4.9 N (Compressive)
(B) 4.9 N (Extensive)
(C) 0.707 N (Compressive)
(D) 0.707 N (Extensive)

And so on

Metallurgy / Material

Q.1. The empirical rule to predict the existence of solid solubility is called
(A) Lever Rule (B) Hund's Rule (C) Henry's Rule (D) Hume-Rothery's Rule

Q.2. In F.C.C lattice the packing sequence of atoms is
(A) AB ABAB ___ (B) BC BCBC ___ (C) AC ACAC ___ (D) ABC ABC ___

Q.3. In screw dislocation, the dislocation line is
(A) parallel to burger's vector (B) perpendicular to burger's vector
(C) at an angle of 30° to the burger's vector (D) None of A, B, C.

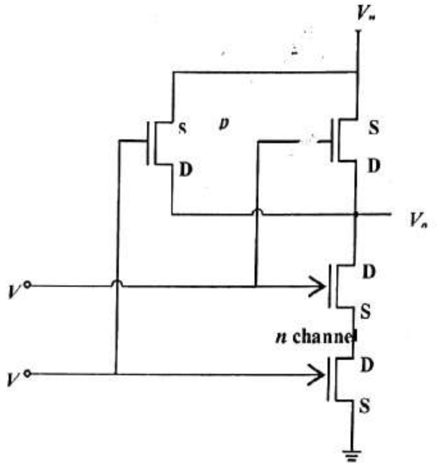
And so on

Computer

Q.1 The term 'word' in computer terminology refers to:
(A) Bits formed into groups (B) Coded instructions
(C) Stored instructions (D) Programming language used

Q.2 A network of geographically distant computers and terminals is called a
(A) Bus (B) WAN (C) LAN (D) Hub

Q.3 The CMOS circuit shown in the following figure, is an implementation of



(A) NOR gate
(B) NAND gate
(C) AND gate
(D) None of the others

And so on

Civil

Q.1. In the Mohr's stress circle, the centre has coordinates
(A) (0, 0) (B) (σ_x, σ_y) (C) [0, 0.5 ($\sigma_x + \sigma_y$)] (D) [0.5 ($\sigma_x + \sigma_y$), 0]

Q.2. The statement that a fluid's velocity of flow through a porous medium is directly related to the hydraulic gradient, is known as
(A) Hook's Law (B) Stoke's Law (C) Newton's Law (D) Darcey's Law

Q.3. How much axial load can a compression block (cross-section = 100 by 100 mm) carry if its rupture stresses in compression and shear are 20 and 9 MPa respectively?
(A) 200 kN (B) 90 kN (C) 180 kN (D) 400 kN

REPRESENTATIVE QUESTIONS OF TEST PAPER

And so on

Mechatronics

Q1.Polling is a method used for
(A) determining the state of the microprocessor
(B) establishing communication between the CPU and peripheral
(C) establishing a priority for communication with several peripherals
(D) determining the next instruction

Q2. Selective Compliant Assembly Robot Arm (SCARA), robots are being increasingly used for
(A) loading / unloading conveyor systems
(B) large area cover
(C) providing intricate movements
(D) assembly operations particularly in the field of electronics

Q3. The Nyquist plot of loop transfer function G(s) H(s) of a closed loop control system passes through the point (-1, j0) in the G(s) H(s) plane. The phase margin of the system is
(A) 0° (B) 45° (C) 90° (D) 180°

And so on

Geology / Geo Physics

Q1. The Sun is part of the:
A) Asteroid belt. B) Oort Cloud belt.
C) Milky Way galaxy. D) none of these.

Q2. The most dense planet is:
A) Jupiter B) Venus C) Mars D) Earth

Q3. The portion of the continental margin that marks the true edge of the continent is the:
A) abyssal plain. B) continental rise.
C) continental slope. D) continental shelf.

And so on

Mining

Q1. Which of the following has higher detonation velocity?
A) Slurry B) Water gel
C) Emulsion D) ANFO

Q2. The water resistance of ANFO is:
A) Very good B) Good C) Fair D) Poor

Q3. An explosion which will not initiate with a No.8 cap is classified as
A) Blasting Agent B) High Explosive
C) Low explosive D) None of these

And so on

Mathematics

Q1. Which of the following is an equation of the line tangent to the graph of $y = x + e^x$ at $x = 0$?

A) $y = x + 1$ B) $y = 2x$
C) $y = 2x + 1$ D) $y = x + 2$

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REPRESENTATIVE QUESTIONS OF TEST PAPER

Q2. Let B be a 2×2 matrix for which there is a constant m such that the sum of the entries in each row and each column is m. Which of the following must be an eigenvector of B?

I. $\binom{1}{0}$

II. $\binom{0}{1}$

III. $\binom{1}{1}$

A) I only B) II only C) III only D) I and II only

Q3. If $\lfloor x \rfloor$ denotes the greatest integer not exceeding x, then $\int_0^\infty \lfloor x \rfloor \, e^{-x} \, dx =$

A) $\frac{e}{e^{2-1}}$ B) $\frac{1}{e-1}$ C) $\frac{e-1}{e}$ D) 1

And so on

Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practice.

Read the following passage and answer the questions given at the end.

Questions 1 – 5:

According to Albert Einstein the non mathematician, is seized by a mysterious shuddering when he hears of 'four-dimensional' things, he is seized by a feeling, which is very similar to the thoughts awakened by the occult. And at the same time the statement that the world in which we live is a four-dimensional space - time continuum is quite a common place statement. This might lead to an argument regarding the use of the term "commonplace" by Einstein. Yet the difficulty lies more in the wording than the ideas. Einstein's concept of the universe as a four-dimensional space-time continuum becomes plain and clear, when what he means by "continuum" becomes clear. A continuum is something that is continuous, A ruler, for example, is a one-dimensional space continuum. Most rulers are divided into inches and fractions, scaled down to one-sixteenth of an inch. Will it be possible to conceive a ruler, which is calibrated to a millionth or billionth of an inch. In theory there is no reason why the steps from point to point should not be even smaller. What distinguishes a continuum is the fact that the space between any two points can be sub-divided into an infinite number of smaller divisions. A railroad track is a one-dimensional space continuum and on it the engineer of a train can describe his position at any time by citing a single co-ordinate point - i.e., a station or a milestone. A sea captain, however, has to worry about two dimensions. The surface of the sea is a two-dimensional continuum and the co-ordinate points by which sailor fixes his positions in his two dimensional continuum are latitude and longitude. An airplane pilot guides his plane through a three - dimensional continuum, hence he has to consider not only latitude and longitude, but also his height above the ground. The continuum of an airplane pilot constitutes space as we perceive it. In other words, the space of our world is a three-dimensional continuum. Just indicating its position in space is not enough while describing any physical event, which involves motion. How position changes in time also needs to be mentioned. Thus to give an accurate picture of the operation of a New York - Chicago express, one must mention not only that it goes from New - York to Albany to Syracuse to Cleveland to Toledo to Chicago, but also the times at which it touches each of those points. This can be done either by means of a timetable or a visual chart. If the miles between New York and Chicago are plotted horizontally on a piece of ruled paper and the hours and minutes are plotted vertically, then a diagonal line properly drawn across the page illustrates the progress of the train in two - dimensional space - time continuum. This type of graphic representation is familiar to most newspaper readers; a stock market chart, for example, pictures financial events in a two - dimensional dollar - time continuum. Similarly for the best picturization of the flight of an airplane from New York to Los Angeles a four - dimensional space - time continuum is essential. The latitude, longitude and altitude will only make sense to the traffic manager of the airline if the time co - ordinate is also mentioned. Therefore time is the fourth dimension. If a flight has to be looked at, perceived as a whole, it wouldn't work if it is broken down into a series of disconnected take - offs, climbs, glides, and landing, it needs to be looked at and perceived as a continuous four - dimensional space - time continuum curve.

Question 1: In order to explain a difficult topic, the author use

A. A plain writing style
B. An incessant metaphor
C. Simply phrased definition's
D. Familiar images

Question 2: The significant feature of a continuum, according to the passage, revolves around

A. The divisibility of the interval between any two points.
B. An ordinary ruler's caliber for marking
C. Its unending curve
D. Its lucid from providing comprehensibility to the non - scientists as well

Question 3: The purpose of this passage is to highlight the point that

A. Stock market charts may be helpful to physicists
B. Plots and sea captains have something in common
C. The fourth dimension is time.
D. Non - mathematician's are often afraid of the commonplace

Question 4: According to the passage, an airlines traffic manager depends upon all of the following EXCEPT

A. Longitude
B. altitude
C. the time co - ordinate
D. Latitude

Question 5: The underlying tone of this selection is

A. Persuasive
B. deferential
C. candid
D. Instructive

Question 6: President Anwar el - Sadat of Egypt, disregarding ______ criticism in the Alab world and in his own Government, ______ accepted prime minister Menahem Begin's invitation to visit Israel in order to address the Israeli parliament.

A.acrimonious – formally
B.blemished - stiffly
C.categorical - previously
D.malignant – plaintively

Question 7: In his usual _____ manner, he had insured himself against this type of loss.

A.pensive
B.providential
C.indifferent
D.circumspect

Question 8: Despite assorted effusion to the contrary, there is no necessary link between scientific skill and humanism, and quite possibly, there may be something of a _______ between them.

- **A.** dichotomy
- **B.** congruity
- **C.** generosity
- **D.** fusion

Question 9: Ironically, the party leaders encountered no greater _______ their efforts to build as Progressive Party than the _____ of the progressive already elected to the legislature.

- **A.** obstacle to – resistance
- **B.** support for - advocacy
- **C.** praise for - reputation
- **D.** threat to - promise

Question 10: No longer ______ by the belief that the world around us was expressly designed for humanity, many people try to find intellectual ___ for that lost certainty in astrology and in mysticism.

- **A.** satisfied - reasons
- **B.** reassured - justifications
- **C.** restricted - parallels
- **D.** sustained – substitutes

Write antonyms of the following:

Question 11: ABOMINATE:

- **A.** loathe
- **B.** despise
- **C.** adore
- **D.** abhor

Question 12: RECANT:

- **A.** entangle
- **B.** rescue
- **C.** fail
- **D.** assert

Question 13: SCURRILOUS:

- **A.** Decent
- **B.** savage
- **C.** major
- **D.** volatile

Question 14: TOUT

A.cast aspersions on
B.deny the relevance of
C. misrepresent
D. withhold consent

Question 15: SCOTCH

A.renovate
B. entrust
C.unfasten
D. encourage

Choose the correct Analogies.

Question 16: CONFIRMED: INVETERATE

A.knowledge : supposed
B.financial : bankrupt
C.immature : callow
D.credible : incredible

Question 17: DORY: VAN

A.dairy : cow
B.fish : vehicle
C.freighter : caisson
D. runners : wheels

Question 18: NEEDLE: KNIT

A.bait : fish
B.match : fire
C. loom : weave
D.soap : wash

Question 19: WINE: GRAPES

A. liquor : intoxicating
B.whiskey : hops
C. champagne : raisins
D. vodka : potatoes

Question 20: ENTREPRENEUR: LABORER

A. mediator : conflict
B. capitalism : communism
C. profits : wages
D. arbitrator : capitalist

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 21: The equation having null set as its solution set is

A. $x = \cos x$
B. $x = e^x$
C. $x = \sin x$
D. $x = \tan x$
E.

Question 22: The value of $\text{Lim}_{x\to\infty} (1+ 4/x)^{x/4}$ is

A. e^4
B. $4/e$
C. $e/4$
D. e

Question 23: The value of $\int \frac{\log x}{x^2} dx$ is

A. $\log(x+1)+C$
B. $-\frac{1}{x}\log(x+1)+C$
C. $\log(x-1)+C$
D. $\frac{1}{2}\log(x+1)+C$

Question 24: If f: R → R be a differentiable function and $f(1) = 4$, then the value of

$\lim_{x\to 1}\int_4^{f(x)}\frac{2t}{x-1}\,dt$ is

A. $8f'(1)$
B. $4f'(1)$
C. $2f'(1)$
D. $f'(1)$

Question 25: The natural exponential function is defined by the equation

A. $y = a^x$
B. $y = 2^x$
C. $y = e^x$
D. $y = 3^x$

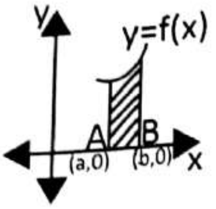
Question 26: Optimize means ________ a quantity under certain constraints:

A. minimize
B. maximize
C. maximize or minimize
D. none of the above

Question 27: If a body is moving with a uniform angular speed around a circular path then the linear velocity of the body is directed along

A. The circular path
B. The normal to the path
C. The tangent to the path
D. None of these

Question 34: The shaded area in the figure can be represented by



A. $\int_0^a f(x)\,dx$
B. $\int_0^b f(x)\,dx$
C. $\int_b^a f(x)\,dx$
D. $\int_a^b f(x)\,dx$

Question 35: If the inclination of a line is 4 π then equation of that line is

A. $x - y = 0$
B. $x + y = 0$
C. $2x - y = 1$
D. $x + y = 1$

Question 36: The length and breadth of a plane is

A. finite
B. infinite
C. x, y
D. $x + y$

Question 37: If volume of a parallelepiped with $\bar{a}, \bar{b}, \bar{c}$ as co-terminus edges is 24 the volume of the tetrahedron with the same edges is

A. 48
B. 12
C. 6
D. 4

Question 38: The derivative of Sin-1 a + Tan –1 a w.r.t x is equal to

A. $\frac{1}{\sqrt{1-a^2}}$
B. $\frac{1}{1+a^2}$
C. $\frac{1}{\sqrt{1-a^2}} + \frac{1}{1+a^2}$
D. 0

Question 39: If δx or dx is quite small then the difference between dy and δy will be

A. very large
B. large
C. small
D. Negligible

Question 40: The anti-derivative of the function $f(y) = \tan^2 y \operatorname{cosec}^2 y$ is

A. $\tan^2 y + c$
B. $\tan y + c$
C. $\operatorname{cosec}^2 y + c$
D. $\operatorname{cosec} y + c$

Question 41: If point P divides a line segment P1P2 internally then the ratio is

A. Positive
B. Negative
C. 1 : 2
D. 1 : 3

Question 42: Let $f: S \rightarrow T$ be a one – to – one function such that $f(x_1) = 6$ and $f(2) = 6$ then the value of x_1 is :

A. 6
B. 2
C. 3
D. 12

Question 43: The elements of a matrix can _______ the complex numbers or imaginary numbers.

A. not be
B. be
C. sometime
D. none of these

Question 44: The value of determinant of the matrix

$$\begin{matrix} \cos 2\alpha & \cos^2\alpha & \sin^2\alpha \\ \cos 2\beta & \cos^2\beta & \sin^2\beta \\ \cos 2\gamma & \cos^2\gamma & \sin^2\gamma \end{matrix} \quad \text{is}$$

A. 1
B. 2
C. 0
D. -1

Question 45: Direction of Qibla is found by using ________

A. Plane Geometry
B. Spherical Trigonometry
C. Plane Trigonometry
D. Analytical Geometry

Question 46: The number of words which can be formed out of the word "ASSASSINATION", when all the letters are used in each word are

A. $\binom{13}{4,3,2,2,1,1}$
B. $13!$
C. $\frac{4!}{13!}$
D. $\frac{13}{4!}$

Question 47: The number of ways a hockey eleven can be selected out of 15 players if it includes a particular player.

A. $^{15}C_{11}$
B. $^{14}C_{11}$
C. $^{15}C_{10}$
D. $^{14}C_{10}$

Question 48: Teams A & B are playing football match. The probability that A will win is 4/13 that of B is 5/13. The probability that the match will end in a draw is

A. 5/13
B. 4/13
C. 9/13
D. 3/13

Question 49: Teams A & B are playing football match. The probability that A will win is 4/13 that of B is 5/13. The probability that the match will end in a draw is

A. 5/13
B. 4/13
C. 9/13
D. 3/13

Question 50: If the area of a rectangle is 56 & the length is one more than the breadth then the dimensions are

A. −8, -7
B. 8, 7
C. 14, 4
D. 28, 2

Section (III):
Physics (Questions 51-80)

***In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.**

Question 51: The quantity of heat required to rise the temperature of 1Kg of water through 1K, in Joules is:

A. 420
B. 4200
C. 4.2
D. 42

Question 52: Two Carnot heat engines would have same efficiencies when:

A. The difference of temperature of their heat sources and heat sinks is same
B. The temperature of their heat sources is same
C. The same amount of heat energy is supplies to them
D. None of these

Question 53: The force between two similar unit charges placed one meter apart in air in Newton is:

A. Zero
B. 1
C. 9×10^9
D. None of these

Question 54: How three resistors each of resistance 3Ω could be connected with each other so that their net resistance with a 2Ω series resistor is 3Ω:

A. In series
B. In parallel
C. In complex network
D. Conventional current

Question 55: The velocity of the body is increase to 100% then linear momentum of the body increase to:

A. 50 %
B. 100 %
C. 10 %
D. 35 %

Question 56: If the axis of rotation passes through the body itself the corresponding rotator motion is called the:

A. Spin –motion
B. Orbital motion
C. Vibratory motion

D. To-and for motion

Question 57: The tidal energy is due to:

- **A.** The rotation of earth about sun
- **B.** The rotation of earth relative moon
- **C.** The radio active decay inside earth
- **D.** Attraction of sun and moon

Question 58: The K. E of a 1000 kg car moving at a speed of 80 km/hr will be.

- **A.** 2.47×10^8 J
- **B.** 2.47×10^5 J
- **C.** 24.7×10^7 J
- **D.** 24.7×10^3 J

Question 59: The wave theory of light was proposed by.

- **A.** Galileo
- **B.** Huygens
- **C.** Kepler
- **D.** Hewton

Question 60: The path difference in destructive interference must be:

- **A.** $d = 0, 2\lambda, 3\lambda$
- **B.** $d = \lambda/2, 3\lambda/2, 5\lambda/2$
- **C.** $d = 0, \lambda/6, 3\lambda/6, 5\lambda/6$
- **D.** $d = 0, 3\lambda/4, 5\lambda/4$

Question 61: The fact that energy point on any advancing wave front may be considered as a source of secondary wave which move forward s spherical wavelets is a principle attributed to,

- **A.** Faraday
- **B.** Michelson
- **C.** Huygen
- **D.** Galileo

Question 62: The wave length of a radio wave when transmitted as a frequency of 150 MHz, will be:

- **A.** 20 m
- **B.** 2 m
- **C.** 10 m
- **D.** 0.75 m

Question 63: Mark the false statement:

A. Doppler effect is used in measuring the speed of automobile
B. Doppler effect provides a method for tracking satellite
C. Each proton has total energy E = hv (where h = plank's, v = frequency of the electromagnetic field's)
D. X - rays are electromagnetic waves with long wavelength.

Question 64: The source of electric energy in an artificial satellite is:

A. A mini nuclear reactor
B. A dynamo
C. A thermo pile
D. Solar cells

Question 65: If a projectile is projected at an angle of 35°, it hits certain target. It will have the same range if it is projected at an angle of

A. 45°
B. 55 °
C. 90 °
D. 70 °

Question 66: When two equal forces F and F makes an angle 180° with each other the magnitude of their resultant is.

A. F
B. 0
C. 2F
D. 0.5F

Question 67: Due to change of magnetization some heat is produced in the coils of transformer when alternating current is supplied at its input. This process is called:

A. Rectification
B. Drifting
C. Induction
D. Hysteresis

Question 68: A magnet is introduced onto the coil and a voltage is induced across the coil. Which of the following factor has no effect on the induced voltage?

A. Thickness of the wire of the coil
B. The strength of the magnetic field
C. The time in which magnet is introduced
D. Number of turns of the coil

Question 69: The couple per unit twist of the suspension is equal to

A. Sum of deflection and restoring torque
B. Product of deflection and restoring torque
C. Deflection per restoring torque

D. Restoring torque per deflection

Question 70: Maximum change in wave length of X-rays photon could be obtained when X-rays are scattered at:

A. Right angle
B. 180⁰
C. 45⁰
D. 0⁰

Question 71: Special theory of relativity deals with:

A. Objects moving with accelerated speed
B. Objects moving with variable speed
C. Objects moving with constant speed
D. Both a and b

Question 72: Radius of 1st orbit of hydrogen atom is 0.53 oA. Radius of fifth state of Hydrogen atoms is:

A. 2.65°A
B. 13.25°A
C. 20°A
D. Infinite

Question 73: LMFBR is the abbreviation of:

A. Liquid metal fast breeder reactor
B. None of these
C. Lithium metal Fission breeder reactor
D. Lithium metal of Fission and Bomb Radiation

Question 74: Cancer of the thyroid glands is treated by

A. ${}_1H^3$
B. ${}_6C^{14}$
C. ${}_{53}I^{131}$
D. ${}_6C^{19}$

Question 75: In treating a localized cancerous tumor a narrow beam of

A. Alpha Rays from Cobalt 60 is used
B. Laser beam from cobalt 60 is used
C. Gamma Rays from cobalt 60 is used
D. Beta Rays from cobalt 60 is used

Question 76: Speed of sound is ________ speed of light

A. greater then
B. less than
C. equal to

D. nothing can be said

Question 77: A unit vector is obtained by dividing a vector with:

A. Its direction
B. Its magnitude
C. Its magnitude and direction
D. None

Question 78: Work-energy equation can be expressed as:

A. $Fa = K.E_f - K.E_i$
B. $ma = (K.E_f)^2 - (K.E_i)^2$
C. $Fd = K.E_f - K.E_i$
D. $F.V = K.E_f - K.E_i$

Question 79: A gymnast sitting on stool with his arms out stretched lowers his arms:

A. The angular speed decreases
B. The angular speed increases
C. Neither increases nor decrease
D. Both increases and decreases

Question 80: If $F = 0.08\ N$ and $x = 4\ cm$ then k =:

A. 6 Nm^{-1}
B. 4 Nm^{-1}
C. 8 Nm^{-1}
D. 2 Nm^{-1}

Section (IV): (This Section is Only For MS Chemistry Candidates)

Chemistry (Questions 81-100)

Question 81: When 0.01 kg of CaCO3 is decomposed the CO2 produced occupies a volume at S.T.P

A. 2.2414 dm3
B. 22.414 dm3
C. 22414 dm3
D. 224014 dm3

Question 82: Chromatography in which stationary phase is solid is called

A. partition chromatography
B. paper chromatography
C. high pressure

D. adsorption chromatography

Question 83: Concept of distribution of velocities among the gas molecules was developed by

A. Claudius
B. Maxwell
C. Boltzman
D. Vanderwaal

Question 84: At equilibrium rate of evaporation and rate of condensation

A. become very high
B. become very low
C. can never be equal
D. become equal

Question 85: Ethanol is much more soluble in water than ethyl ethanuate which one of the following statement correctly account for this

A. ethanol is polar molecule but ethyl ethanoate is non–polar
B. ethanol is non poiar molecule but ethyl ethanoate is polar
C. a hydrogen bond is formed between H–atom of the OH group in ethanol and O–atom of water molecule
D. a hydrogen bond is formed between the H–atom of the OH group in ethanol and hydrogen of the water molecule

Question 86: The wave number of the light emitted by a certain source is 2 x 10^6 m. The wavelength of this light is

A. 500 nm
B. 500 m
C. 200 nm
D. 5 x 10–1 m

Question 87: Slow neutrons are generally more effective than fastness for the purpose of

A. effusion
B. fission
C. penetration
D. absorption

Question 88: Which of the following bonds is least polar?

A. H–Se
B. P–Cl
C. H–Cl
D. N–Cl

Question 89: Octet rule is not followed in the formation of

A. CH_4

B. NF_3
C. BCl_3
D. H_2O

Question 90: Enthalpy of neutralisation of all the strong acids and strong bases has the same value because

A. neutralisation leads to the formation of salt and H2O
B. strong acid and bases are ionic substances
C. acids always give rise to H+ ions and bases always furnish OH– ions
D. the net chemical change involve the combination of H+ and OH– ions to form water

Question 91: Ionization of weak acid is expressed in term of following constant

A. Kw
B. Kn
C. Ka
D. Kb

Question 92: The molar boiling point constant is the ratio of the elevation in boiling point to

A. molarity
B. molality
C. mole fraction of solvent
D. less than that of water

Question 93: The no. of covalent bond in 10gm of NH3 are

A. 6.022 x 1023
B. 1.062 x 1023
C. 10.62 x 1024
D. 1.062 x 1024

Question 94: Gooch crucible is used to filter the solution of

A. $K2Cr_2O_7$
B. $KMnO_4$
C. KOH
D. under suction crucible

Question 95: Which of the following of will have the same number of molecules at STP?

A. 280 cm3 of CO2 and 280 cm3 of N2O
B. 11.2 dm3 of O2 and 32 g of O2
C. 44g of CO2 and 11.2 dm3 of CO
D. 28g of N2 and 5.6 dm3 of oxygen

Question 96: Hydrocarbons which generally have high molecular masses exist is.

A. solid form
B. liquid form
C. vapour form
D. gaseous form

Question 97: Neutron was discovered by Chadwick in

A. 1935
B. 1930
C. 1932
D. 1934

Question 98: Carbon atoms of diamond are

A. sp hybridized
B. sp2 hybridized
C. sp3 hybridized
D. unhybridized

Question 99: The e/m value for the positive rays is maximum for

A. hydrogen
B. helium
C. nitrogen
D. oxygen

Question 100: The colour of the glow produced in the discharge tube depends upon

A. gas
B. electrodes
C. composition of gas
D. pressure

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ANSWER KEY

1	C	26				76	B
2	A	27	C	52	D	77	B
3	B	28	D	53	C	78	C
4	D	29	A	54	B	79	C
5	A	30	D	55	B	80	D
6	A	31	C	56	A	81	A
7	D	32	B	57	D	82	D
8	C	33	C	58	B	83	B
9	A	34	D	59	B	84	D
10	D	35	A	60	B	85	C
11	C	36	B	61	C	86	A
12	D	37	D	62	B	87	B
13	A	38	D	63	D	88	D
14	C	39	D	64	D	89	C
15	D	40	B	65	B	90	D
16	B	41	A	66	B	91	C
17	C	42	A	67	C	92	B
18	C	43	B	68	A	93	D
19	D	44	C	69	D	94	B
20	C	45	B	70	A	95	A
21	B	46	A	71	C	96	A
22	D	47	D	72	B	97	B
23	B	48	B	73	B	98	C
24	A	49	B	74	C	99	A
25	C	50	B	75	C	100	C

21	Slope of e^x is 1 at x = 0 and it keeps increasing after that. Thus y = x cannot cut y = e^x. Thus no real solution.
25	The function $f(x) = ex$ is called the (natural) exponential function, and is the unique exponential function equal to its own derivative. The natural logarithm, or logarithm to base e, is the inverse function to the natural exponential function.
26	A mathematical technique for finding a maximum or minimum value of a function of several variables subject to a set of constraints, as linear programming or systems analysis.
27	The only particularly significant thing about circular motion is not that the velocity is tangential to the circle, but about the relationship between the velocity and the centripetal force that keeps the object constrained to the circle. Circular motion occurs when that force points at right angles to the direction of motion, towards the centre of the circle.
28	If a point (P) moves in the plane in such a way that the ratio of its distance from a fixed point (S is known as focus) in the same plane to its perpendicular distance from the fixed line (L is known as dirctrix) is always constant which is always greater than unity, then the locus traced out by P is called a Hyperbola.
29	Feasible region is the region which is common to all constraints. Thus, all the points in

	the region satisfy all the constraints. If the feasible region is infinite, then it can have an optimum solution in a bounded cost.
30	The locus of points in the plane equidistant from a given point is a circle, and the set of points in three-space equidistant from a given point is a sphere. Considering the information provided points of x,y,z are equidistant from each other hence they represent the locus of a Plane
31	Since $sec^3(\theta)$is constant with respect to y, the integral of $sec^3(\theta)$with respect to y is $sec^3(\theta)y$
32	Different each term with respect to x and solve for y
33	Differentiate the equation with respect to t
34	Since the shaded area represents the data with in the region bound by a & b hence the whole function of the area is limited by a & b
35	Since the angle of inclination is given which is 4pi, Slope = tan4pi = 0, hence the equation x=y or x-y=0, which re[resent a line through the origin
36	A geometric plane is a perfectly flat surface that has infinite length and width, but no thickness.
37	Find out the length of side using V = a^3 (volume of tetrahedron with co-terminus edges) and the use the formula for Volume of tetrahedron = $\frac{a^3}{6*2^{\frac{1}{2}}}$
38	Differentiate using trigonometric functions
40	Since $tanQ.CosecQ = SecQ$, Find out the integral of Sec^2Q
41	The required co-ordinates of the point R are $\left(\frac{mx^2+nx^1}{m+n}, \frac{my^2+ny^1}{m+n}\right)$
43	A matrix can always contain complex numbers.
44	Convert row two and three to tan by multiplying and dividing by respective function and Use If elements of any two row or column of a determinant are equal then the value of the determinant is equal to zero.
45	Spherical trigonometry is the branch of spherical geometry that deals with the relationships between trigonometric functions of the sides and angles of the spherical polygons (especially spherical triangles) defined by a number of intersecting great circles on the sphere.
46	Using the basic rules of combination (n! / a!B!C!..)
47	Since one player is already selected now the positions and choices are reduced by One hence available player are 14 and available positions are 10
48	The total number of outcomes are 13, if A has 4 chances of winning and B has 5, the chances left for draw are 4
49	The total number of outcomes are 13, if A has 4 chances of winning and B has 5, the chances left for draw are 5
50	Area of rectangle = Length x Breadth
51	Using formula: $\boldsymbol{Q = mc\Delta T}$, where m is the mass, delta T is change in Temperature, and C= 4186J
52	Carnot Engine Principles. The efficiency of an irreversible heat engine is always less than the efficiency of a reversible one operating between the same two reservoirs. The efficiencies of all reversible heat engines operating between the same two reservoirs are the same.
53	The magnitude of the electrostatic force of attraction or repulsion between two point

	charges is directly proportional to the product of the magnitudes of charges and inversely proportional to the square of the distance between them Coulombs Law
55	Linear momentum is defined as the product of a system's mass multiplied by its velocity. In symbols, linear momentum is expressed as $p = mv$. Momentum is directly proportional to the object's mass and also its velocity. Thus the greater an object's mass or the greater its velocity, the greater its momentum.
56	A rotation is a circular movement of an object around a center (or point) of rotation. ... If the axis passes through the body's center of mass, the body is said to rotate upon itself, or spin.
57	Tidal power or tidal energy is a form of hydropower that converts the energy obtained from tides into useful forms of power, mainly electricity. Although not yet widely used, tidal energy has potential for future electricity generation. Tides are more predictable than the wind and the sun.
58	Using Formula $\boldsymbol{K.E} = \frac{1}{2}\boldsymbol{mv^2}$
59	Sir Isaac Newton, held the theory that light was made up of tiny particles. In 1678, Dutch physicist, Christiaan Huygens, believed that light was made up of waves vibrating up and down perpendicular to the direction of the light travels, and therefore formulated a way of visualising wave propagation.
60	If the two amplitudes have opposite signs, they will subtract to form a combined wave with a lower amplitude. This is called destructive interference. Destructive interference: Once we have the condition for constructive interference, destructive interference is a straightforward extension. The basic requirement for destructive interference is that the two waves are shifted by half a wavelength.
61	In 1678, Dutch physicist, Christiaan Huygens, believed that light was made up of waves vibrating up and down perpendicular to the direction of the light travels, and therefore formulated a way of visualising wave propagation.
62	Speed of a wave = wavelength X frequency. Where speed of wave is 2.997 X 10^8
63	X rays are electromagnetic radiation like visible light, radiowaves, and ultraviolet light. These electromagnetic radiations differ only in the amount of energy they have. Gamma rays and x rays are the most energetic of these. Most X-rays have a wavelength ranging from 0.01 to 10 nanometers, corresponding to frequencies in the range 30 petahertz to 30 exahertz (3×1016 Hz to 3×1019 Hz) and energies in the range 100 eV to 100 keV. X-ray wavelengths are shorter than those of UV rays and typically longer than those of gamma rays.
66	The sum of two vectors is dependent on the angle between the two vectors and not only on their magnitudes. When we are performing a sum with two scalars, we only add their magnitudes. On the other hand, vectors possess both a magnitude and a direction and therefore the sum of two vectors becomes slightly more tricky than in the case of scalars.
67	With regard to magnetic fields, a magnetic field is generated when a current flows through a wire. This current can be D.C. too - the phenomena is not limited to A.C. current. The direction of the magnetic field depends upon the direction of current flow.
68	Factors affecting the induced current: Magnetic strength of the core in the coil of wire. Number of turns of wire in the coil **(more turns --> bigger emf)** The cross-sectional area of the coil **(bigger area --> bigger emf)**.

69	Torsional rigidity is also known as the twisting couple per unit twist. As the name suggests it is the amount of twisting couple or torque required to twist the object by one unit angle, i.e., one radian in other words restoration of torque per deflection
71	The theory of relativity is a theory that deals with the motion of objects when their speed is close to the speed of light c=3×108m/sec. ... The special theory of relativity only deals with the motion of objects as seen from inertial frames. The general theory of relativity extends it to cover non-inertial frames as well.
72	Using Formula: $Rn = \frac{\varepsilon 0n^{2h^2}}{\pi me^2}$
73	The liquid metal fast breeder reactor (LMFBR) is a nuclear reactor that has been modified to increase the efficiency at which non-fissionable uranium-238 is converted to fissionable plutonium 239, which can be used as fuel in the production of nuclear power .
74	Radioactive Iodine (Radioiodine) Therapy for Thyroid Cancer. Your thyroid gland absorbs nearly all of the iodine in your body.
75	Cobalt therapy or cobalt-60 therapy is the medical use of gamma rays from the radioisotope cobalt-60 to treat conditions such as cancer. ... Cobalt therapy was a revolutionary advance in radiotherapy in the post-World War II period but is now being replaced by other technologies such as linear accelerators.
77	To find a unit vector with the same direction as a given vector, we divide by the magnitude of the vector. For example, consider the vector v = (1, 3) which has a magnitude of . If we divide each component of v by we will get the unit vector uv which is in the same direction as v
78	The formula for net work is net work = change in kinetic energy = final kinetic energy - initial kinetic energy. The work energy theorem, this is a theorem that states the net work on an object causes a change in the kinetic energy of the object.
79	Neither cause the gymnast is staionary if hehad been in a spin motion things would be different
80	Using FormulaL **F = -Kx** where x is in meters
82	Adsorption means to stick to the surface. ... Adsorption chromatography uses a stationary phase in the solid state and a mobile phase in the liquid or gas state. It works because there's a balance that each solute has between adsorption on the surface of the solid and solubility in the solvent.
83	The Distribution of Molecular Speeds Is Given by the Maxwell-Boltzmann Distribution. In the context of the Kinetic Molecular Theory of Gases, a gas contains a large number of particles in rapid motions. ... An understanding of the properties of the gas requires an understanding of the distribution of particle speeds.
84	When the vapor pressure has now increased to the point where the rate of evaporation is equal to the rate of condensation. In a closed system, a dynamic equilibrium will be reached, where the rate of evaporation equals the rate of condensation.
85	Ethanol is soluble in water because it's polar i.e. It has a partial negative charge(carbanion C2H5O) & a partial positive charge(hydrogen ion H+). These charges allows ethanol to form hydrogen bond with water,hence dissolve in water. It can be confusing.
86	What is the relationship between wavelength, wave number, and frequency? The wave number is defined as spatial wavelength and it is inversely proportional to the

	wavelength. The wave number is measured in the reciprocal of length and unit of wave number is per meter.
87	Slow neutron can be captured by a uranium-235 nucleus, rendering it unstable toward nuclear fission. A fast neutron will not be captured, so neutrons must be slowed down by moderation to increase their capture probability in fission reactors.
88	Nitrogen and Chlorine have almost equal electronegativity, Nitrogen 3.04 and Chlorine have 3.16 So, polarity is more on Barium - Oxygen bond Barium has 0.89 and Oxygen has 3.44
89	The octet rule refers to the tendency of atoms to prefer to have eight electrons in the valence shell (outer orbital). When atoms have fewer than eight electrons. Notable exceptions are aluminum and boron, which can function well with six valence electrons. Consider BF3. The boron shares its three electrons with three fluorine atoms. The fluorine atoms follow the octet rule, but boron has only six electrons. Although atoms with less than an octet may be stable, they will usually attempt to form a fourth bond to get eight electrons. BF3 is stable, but it will form BF4- when possible. Most elements to the left of the carbon group have so few valence electrons that they are in the same situation as boron: they are electron deficient. Electron deficient elements often show metallic rather than covalent bonding.
90	The enthalpy of neutralization for all strong acid-strong base reactions should be the same within experimental error because all those reactions are in simple terms, H+ + OH- = H2O. Although the enthalpy of neutralization for all strong acid-strong base reactions are within experimental error, that is not the case of weak acid-strong base reactions. This is not the case because weak acids do not completely dissociate into ions like strong acids do. Therefore the enthalpy of weak acid-strong base reactions is less than the enthalpy of strong acid-strong base reactions.
91	The Acid Ionization Constant, K. The ionization for a general weak acid, HA, can be written as follows: Because the acid is weak, an equilibrium expression can be written. An acid ionization constant (Ka) is the equilibrium constant for the ionization of an acid.
92	The boiling point of the solvent above the solution is directly proportional to molality because it changes with the change in the concentration of the solution.
93	**molar mass NH3 = 14.01 + 1.01 x 3 = 17.04 g/mol and mol NH3 in sample = 10 g NH3 x [1 mol / 17.04 g]** each molecule of NH3 has 3 covalent bonds and each mole of molecules is 6.022 x 10^{23} molecules so number of covalent bonds in sample = 10 g NH3 x [1 mol / 17.04 g] x [6.022 x 10^{23} molecules / mol] x [3 covalent bonds / NH3 molecule] = 1.06 x 10^{24} covalent bonds
94	A Gooch crucible, named after Frank Austin Gooch, is a filtration device for laboratory use (and was also called a Gooch filter). It is convenient for collecting a precipitate directly within the vessel in which it is to be dried, possibly ashed, and finally weighed in gravimetric analysis.
95	First you calculate the number of moles by dividing the mass of the sample by the molar mass of the compound. You then calculate the number of formula units by multiplying by Avogadro's number. You will have to do this for every option.
96	Hydrocarbons of low molecular weight, e.g., methane, ethane, and propane, are gases; those of intermediate molecular weight, e.g., hexane, heptane, and octane, are liquids; and those of high molecular weight, e.g., eicosane (C 20H 42) and

	polyethylene, are solids.
97	It is remarkable that the neutron was not discovered until 1932 when James Chadwick used scattering data to calculate the mass of this neutral particle.
98	The electronic configuration of carbon is 1s22s22p2, i.e. with four valence electrons spread in the s and p orbitals. In order to create covalent bonds in diamond, the s orbital mixes with the three p orbitals to form sp3 hybridization.
99	Hydrogen has the heighest e/m vale of positive / anode rays
100	The color of the glow inside the discharge tube depends upon the composition of the gas.

**DON'T LIMIT YOUR
CHALLENGES.
CHALLENGE YOUR
LIMITS.**

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Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practice.

Read the following passage and answer the questions given at the end.

Questions 1 – 5:

MARK HUGHES is a master of the fine art of survival. His Los Angeles-based Herbalife International Inc. is a pyramid outfit that peddles weight-loss and nutrition concoctions of dubious value. Bad publicity and regulatory crackdowns hurt his U.S. business in the late 1980s. But Hughes, 41, continues to enjoy a luxurious lifestyle in a $20 million Beverly Hills mansion. He has been sharing the pad and a yacht with his third wife, a former Miss Petite U.S.A. He can finance this lavish lifestyle just on his salary and bonus, which last year came to $7.3 million. He survived his troubles in the U.S. by moving overseas, where regulators are less zealous and consumers even more naive, at least initially. Today 77% of Herbalife retail sales derive from overseas. Its new prowling grounds: Asia and Russia. Last year Herbalife's net earnings doubled, to $45 million, on net sales of $632 million. Based on Herbalife's Nasdaq-traded stock, the company has a market capitalization of $790 million, making Hughes 58% worth $454 million. There's a worm, though, in Hughes apple. Foreigners aren't stupid. In the end they know when they've been had. In France, for instance, retail sales rose to $97 million by 1993 and then plunged to $12 million last year. In Germany sales hit $159 million in 1994 and have since dropped to $54 million. Perhaps aware that the world may not provide an infinite supply of suckers, Hughes wanted to unload some of his shares. But in March, after Herbalife's stock collapsed, he put off a plan to dump about a third of his holdings on the public. Contributing to Hughes' woes, Herbalife's chief counsel and legal attack dog, David Addis, quit in January. Before packing up, he reportedly bellowed at Hughes, "I can't protect you anymore." Addis, who says he wants to spend more time with his family, chuckles and claims attorney-client privilege. Trouble on the home front, too. On a recent conference call with distributors, Hughes revealed he's divorcing his wife, Suzan, whose beaming and perky image adorns much of Herbalife's literature. Meanwhile, in a lawsuit that's been quietly moving through Arizona's Superior Court, former Herbalife distributor Daniel Fallow of Sandpoint, Idaho charges that Herbalife arbitrarily withholds payment to distributors and marks up its products over seven times the cost of manufacturing. Fallow also claims Hughes wanted to use the Russian mafia to gain entry to that nation's market. Fallow himself is no angel, but his lawsuit, which was posted on the Internet, brought out other complaints. Randy Cox of Lewiston, Idaho says Herbalife "destroyed my business" after he and his wife complained to the company that they were being cheated out of their money by higher-ups in the pyramid organization. Will Hughes survive again? Don't count on it this time.

Question 1: Herbalife Inc is based in:

A. Los Angeles
B. Columbus
C. New York
D. Austin

Question 2: Daniel Fallow:

A. Co-founded Herbalife
B. Was a former distributor of Herbalife
C. Was a former attorney for Hughes
D. Ran Herbalife's German unit

Question 3: Which of the following countries is mentioned where Hughes operated Herbalife?

A. China
B. India
C. Germany
D. Ukraine

Question 4: The complaint of Randy Cox of Lewiston, Idaho, against Herbalife was:

A. The company did not pay them their dues
B. The products supplied by Hughes were inferior
C. Their higher-ups in the pyramid cheated them
D. Hughes had connections with the Russian mafia

Question 5: In the year in which Hughes' salary and bonuses came to US$ 7.3 million, what was the retail sales for Herbalife in France?

A. $12 million
B. $159 million
C. $54 million
D. $97 million

Question 6: The Sociologist responded to the charge that her new theory was _______ by pointing out that it did not in fact contradict accepted sociological principles.

A. unproven
B. hereticalt
C. superficial
D. complex

Question 7: The most technologically advanced societies have been responsible for the greatest ______ indeed savagery seems to be indirect proposition to ____

A. inventions - know-how
B. wars - viciousness
C. triumphs - civilizations
D. atrocities – development

Question 8: Clearly refuting sceptics, researchers have _____ not only that gravitational radiation exists but that it also does exactly what the theory___ it should do.

A. assumed - deducted
B. demonstrated – predicted
C. supposed - asserted

D. doubted - warranted

Question 9: Ecology, like economics, concerns itself with the movement of valuable ____ through a complex network of producers and consumers.

A. nutrients
B. dividends
C. communications
D. artifacts

Question 10: Without the psychiatrist's promise of confidentiality, trust is _____ and the patient's communication limited; even though confidentiality can thus be seen to be precious in thercopy, moral responsibility sometimes requires a willingness to ____ it.

A. lost - forget
B. implicit - extend
C. impaired – sacrifise
D. ambiguous - apply

Write antonyms of the following:
Question 11: OBSEQUIOUS:

A. servile
B. first
C. fawning
D. supercilious

Question 12: PLENITUDE:

A. scarcity
B. magnificence
C. richness
D. contentment

Question 13: DISTEND

A. deteriorate
B. weaken
C. constrict
D. Concentrate

Question 14: OUTLANDISH

A. Conventional
B. prolific
C. unchanging
D. transparent

Question 15: ACUITY

A. quality
B. certainty

C. plenitude
D. stability

Choose the correct Analogies.
Question 16: PARQUET: WOOD

A. color : painting
B. mosaic : glass
C. potpourri : medley
D. collage : tapestry

Question 17: CENSUS: POPULATION

A. manifest : debts
B. roster : audience
C. itinerary : journeys
D. inventory : merchandise

Question 18: EXHORT: SUGGEST

A. conspire : plan
B. tamper : adjust
C. crave : accept
D. goad : direct

Question 19: INFANCY: SENILITY

A. dawn : dusk.
B. incipient : critical
C. day : night
D. conclusion : climax

Question 20: ARBORETUM: TREES

A. aviary : bird
B. greenhouse : garden
C. museum : painters
D. grove : forest

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 21: The value of e as sum of the series is

A. $1+\frac{1}{2}+\frac{1}{3}+\cdots$
B. $1+2+\frac{1}{3}+\cdots$
C. $1+\frac{1}{1!}+\frac{1}{2!}+\frac{1}{3!}+\cdots$

D. $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \cdots$

Question 22: The derivative of X^x is

A. X^{x-1}
B. $X.X^{x-1}$
C. $X^x(1+l_n x)$
D. $X^x l_n x$

Question 23: A particle thrown vertically upward, moves according to the law, x = 32 – 16t2 (x in ft, t in sec) then the maximum height attained by the particle is

A. 32ft
B. 16ft
C. 48ft
D. 2ft

Question 24: The solution set of 2x3 – 3x2 + 4x – 5 = 0 can have at the most,

A. 4 members
B. 3 members
C. 2 members
D. 5 members

Question 25: Let f(x) = 5x + 3 then f is

A. One – to – one function
B. Onto function
C. Constant function
D. Both one-to-one and onto function

Question 26: If h > 0, then as h approaches zero,) 2 3tan(h □ □ approaches

A. $-\infty$
B. ∞
C. 0
D. -1

Question 27: If R1 = {(x, y)|x, y ϵ R and x >y} is a binary relation then its inverse is

A. {(1, 2), (2, 3)}
B. {(2, 1), (3, 2), (4, 3)}
C. {(x, y)| x = y}
D. {(x, y)| x, y ϵ R and y > x}

Question 28: Non negative constraints are called _______ variables.

A. non – decision
B. decision
C. constant

D. none of the above

Question 29: The points (x, y) which satisfy a linear inequality in two variables x and y form its

A. Domain
B. Range
C. Solution
D. None of these

Question 30: (0, 1) is in the solution of inequality

A. $x - 2y > 0$
B. $x - y < 2$
C. $3x + 2y > 5$
D. $3x - 2y < 2$

Question 31: The value of $\int \frac{1}{y\, l_n y}\, dy$ is

A. $l_n|y| + c$
B. $l_n \frac{1}{y} + c$
C. $\frac{1}{y} + c$
D. $l_n[l_n|y|] + c$

Question 32: The anti-derivative of zero is

A. 1
B. 0
C. x
D. constant

Question 33: If $z = x + iy$ and $w = \frac{1-iz}{z-i}$, then $|w| = 1$ implies that, in the complex plane,

A. z lies on the imaginary axis
B. z lies on the real axis
C. z lies on the unit circle
D. None of these

Question 34: $\lim_{n\to\infty} e^{\frac{r}{n}}$ is

A. e
B. e-1
C. 1-e
D. e+1

Question 35: The value of definite integral $\int_0^1 (1 + e^{-x^2})\, dx$ is

A. -1
B. 2

C. $1 + e^{-1}$
D. None of these

Question 36: When a single rational function is expressed as a sum of two or more single rational functions is called

A. Partial fractions
B. Partial fraction resolution
C. Proper fraction
D. Improper fraction

Question 37: If $\begin{vmatrix} 7x & 3x \\ 2x^2 & p \end{vmatrix} = 7xp - 6x^3$ is a/an

A. equation
B. identity
C. determinant
D. none

Question 38: For the general solution, we find the solution in the interval whose length is equal to its:

A. Range
B. Domain
C. Co-domain
D. Period

Question 39: In any triangle ABC, with usual notations, abc =

A. R
B. RS
C. 4RΔ
D. $\frac{\Delta}{s}$

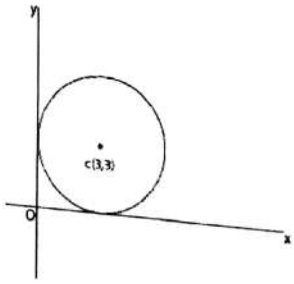
Question 40: The graph of function y = sin 2x, will be between the lines

A. x=1 & x = -1
B. y = 1 & y = -1
C. x = 2 & x = -2
D. y = 2 & y = -2

Question 41: The derivative of exp (sinx) is

A. exp (cosx)
B. sinx exp(cosx)
C. (cosx) exp (sinx)
D. cosx exp (cosx)

Question 42: The circumference of the circle given in the figure is



A. 6π
B. 9π
C. 3π

D. 12π

Question 43: The curve of the parabola $y^2 = 4ax$ is symmetrical with respect to

A. Origin
B. X-axis
C. Y-axis
D. Both the axis

Question 44: The direction Cosines of $\bar{i}$ are
A. 0, 0, 1
B. 0, 1, 0
C. 1, 0, 0
D. 1, 1, 0

Question 45: The coordinates of the center of the sphere $x^2 + y^2 + z^2 = 9$ is

A. (0, 0)
B. (3, 3, 0)
C. (0, 0, 0)
D. (0, 0, 3)

Question 46: Product of roots of any quadratic equation is

A. $\frac{coefficient\ of\ x^2}{coefficient\ of\ x}$
B. $\frac{coefficient\ of\ x}{coefficient\ of\ x^2}$
C. $-\frac{coefficient\ of\ x}{coefficient\ of\ x^2}$
D. $\frac{constant\ term}{coefficient\ of\ x^2}$

Question 47: Which term of $(x + 2)^8$ is independent of x

A. First
B. Second
C. Middle
D. Last

Question 48: The middle term in the expansion of $(a + b)^n$ is $\left(\frac{n}{2} + 1\right)$; $then\ \ n\ is$

A. Odd
B. Even
C. Prime
D. None of these

Question 49: The geometric mean between 8/9, 9/8 is

A. + 1
B. -1
C. ± 1

D. $\frac{8}{17}$

Question 50: S = {1} is trivial group under

A. +
B. ×
C. −
D. division

Section (III):
Physics (Questions 51-80)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 51: A fixed mass of a gas is heated at constant volume. Which one of the following will not change?

A. Average distance between the molecules
B. K. E. of the molecules
C. Average speed of the molecules
D. Frequency of collisions of the molecules

Question 52: S. I. Unit of Relative permittivity is:

A. C^2Nm^2
B. $Nm^{-2}C^{-2}$
C. $C^2N^{-1}m^{-2}$
D. None of these

Question 53: Which of the following pair of unit is equivalent of Joule per coulomb per meter:

A. N/C and V/m
B. Farad and Amp
C. Amp. And Volt
D. Coulomb and Ohm

Question 54: The Flux through a surface will be minimum, when angle between $\vec{E}$ and $\overrightarrow{\Delta A}$ is:

A. 90°
B. 60°
C. 30°
D. 0°

Question 55: Power dissipated in two parallel resistors is inversely proportional to their:

A. Potential difference
B. All of these
C. Current
D. Resistances

Question 56: Scalar product of two vectors obeys.

A. Commutative Law
B. Associate Law
C. Both "a" and "b"
D. None of the above

Question 57: Swimming is possible on account of:

A. First law of motion
B. Second law of motion
C. Third law of motion
D. Newton's law of gravitation

Question 58: Which quantity of audio signal is changed by transistor:

A. All of these
B. Amplitude
C. Frequency
D. Wave length

Question 59: If two bodies of equal mass collide elastically then

A. their velocities are added to each other
B. their velocities are subtracted
C. their velocities do not changed
D. they exchange their velocities

Question 60: During free fall, of air friction is negligible then acceleration of bodies of different masses is:

A. The same for all the masses
B. Different for different masses
C. Different for different vertical positions.
D. Both A & B

Question 61: The value of 'g' at the Centre of earth is:

A. Maximum
B. Minimum
C. Zero
D. None of them

Question 62: A projectile has its speed maximum at the moment of

A. Projection
B. Hitting the ground
C. Both of these
D. None of these

Question 63: Artificial gravity can be created in the space craft by:

A. Revolving it around the earth
B. Spinning it around its own axis
C. Increasing its velocity

D. decreasing its velocity'

Question 64: An ordinary clock loses time in summer this is because:

A. The length of the pendulum increases
B. The length of the pendulum decreases
C. The length of the pendulum decreases and time period increases.
D. The length the pendulum decreases and time period increases.

Question 65: A regiment of soldiers is crossing a suspension bridge. They are ordered to:

A. March in steps
A. Break the Steps
B. Twist their bodies
C. Lie flat and craw!

Question 66: The study of generation production and propagation sound is called:

B. Photometry
C. Acoustics
D. Mechanics
E. Series

Question 67: Which of the following has the shortest wavelength?

A. Gamma rays
B. Ultraviolet
C. Microwaves
D. Radio waves

Question 68: The velocity of sound in air is not affected by changes in the;

A. Moisture content of the air
B. Temperature of the air
C. Atmospheric pressure
D. Compression of the air

Question 69: A thin layer of oil on the surface of water looks coloured due to:

A. Polansation of light.
B. different elements presenting the oil
C. Interference of light
D. The transmission of light

Question 70: Diffraction when source and screen are very near the slit then diffraction is said to be ________ diffraction.

A. Fresnel
B. Fraunhoffer
C. Maxwell
D. Huygens

Question 71: The refraction of different wavelength of light at different angles through a convex lens produce a defected called.

A. Astigmatism
B. Chromatic aberration
C. Spherical aberration
D. Short sightedness

Question 72: "Mirage" is based on the phenomenon of.

A. Reflection
B. Diffraction
C. Refraction
D. Total internal reflection

Question 73: A Modern technique of tracing complexity of molecules is called

A. Tracer technique
B. Radiology
C. Molecular technique
D. Polymerization

Question 74: Path of track of droplets of Alpha Particles in cloud chamber is a

A. Random streak
B. Indefinite streak
C. Continuous streak
D. Discontinuous Streak

Question 75: Critical mass of fissionable isotope of Uranium is:

A. 7.07%
B. 0.7 %
C. 77.07%
D. 0.07%

Question 76: Binding fraction is the:

A. Binding energy Per mass defect
B. Mass defect Per binding energy
C. Mass defect Per nucleon
D. Binding energy Per nucleon

Question 77: Wave nature of particle is linked by:

A. Speed of light
B. Plank's constant
C. Inertial mass
D. Momentum of particle

Question 78: Range of wave length of X-rays is:

A. 400 nm -------- 700 nm

B. 700 nm -------- 1000 nm
C. 100 nm -------- 0.1000 nm
D. 0.1nm --------1nm

Question 79: Where the energy lost by fast moving electron goes?

A. Appears as photon
B. Appears as electron-proton pair
C. Appears as its K.E
D. It variables

Question 80: In pair production we have a pair of:

A. Positron and electron
B. Protons
C. Electrons
D. a and b are correct

Section (IV):

Chemistry (Questions 81-100)

==> THIS SECTION IS ONLY FOR CANDIDATES APPLYING IN MS CHEMISTRY

Question 81: Mole of SO2 contains

A. 6.02 x 1023 atoms of oxygen
B. 18.1 x 1023 molecules of SO2
C. 6.023 x 1023 atom of Sulphur
D. 4 gram of SO2

Question 82: Premature crystallization of solution of filter paper or in funnel can be avoided

A. filtering hot saturated solution using hot funnel
B. filling warm solution
C. quick filtration
D. filtering cold solution

Question 83: The meaning of chromatos

A. colour writing
B. colour spreading
C. colour forming
D. none of these

Question 84: The order of the rate of diffusion of gases NH3, SO2, Cl2 and CO2 is:
A. NH3 > SO2 > Cl2 > CO2
B. NH3 > CO2 > SO2 > Cl2
C. Cl2> SO2 > CO2 > NH3
D. None of these

Question 85: How should the conditions be changed to prevent the volume of a given mass of gas from expanding when its mass is increased

A. temperature is lowered and pressure is increased
B. temperature is increased and the pressure is lowered
C. temperature and pressure both are lowered
D. temperature and pressure both are increased

Question 86: Density of gas is usually expressed a

A. kg m^{-3}
B. kg dm^{-3}
C. g dm^{-3} g cm^{-3}

Question 87: Trend of boiling points of halogens from fluorine to iodine is that it.

A. decreases
B. increases
C. remains constant
D. negligible

Question 88: Which of the following statements is not correct regarding bonding molecular orbitals?

A. bonding molecular orbitals possess less energy than atomic orbitals from which they are formed
B. bonding molecular orbitals have low electron density between the two nuclei
C. every electron in the bonding molecular orbitals contributes to the attraction between atoms
D. bonding molecular orbitals are formed when the electron waves undergo constructive interference

Question 89: Existence of an element in more than form is known as

A. allotropy
B. isomorphism
C. isotropy
D. none of these

Question 90: Rutherford's model of atom failed because

A. the atom did not have a nucleus and electrons
B. it did not account for the attraction between protons and neutrons
C. it did account for the stability of the atom there is actually no space between the nucleus and the electrons

Question 91: Octet rule is not followed in the formation of

A. CH_4
B. NF_3
C. BCl_3
D. H_2O

Question 92: Enthalpy of neutralisation of all the strong acids and strong bases has the same value because

A. neutralisation leads to the formation of salt and H2O
B. strong acid and bases are ionic substances
C. acids always give rise to H+ ions and bases always furnish OH– ions
D. the net chemical change involve the combination of H+ and OH–

Question 93: Buffer action can be explained by

A. common ion effect
B. law of mass action
C. Le–Chatlier's principle
D. all above

Question 94: For which system does the equilibrium constant Kc have units (mole dm–3)–1

A. $H_2 + I_2$ 2HI
B. $N_2 + 3H_2$ $2NH_3$
C. $2NO_2$ N2O_4
D. $CH_3COOH + C_2H_5OH$ $CH_3COOC_2H_5 + H_2O$

Question 95: The freezing mixture used in ice cream machine consists of ice and
A. NaCl
B. CaCl2
C. KNO3
D. both a & c

Question 96: The no. of water of crystallization of MgCl2
A. 12
B. 6
C. 3
D. 4

Question 97: Aqueous solution of glucose boils at 100.52oC. The solution contains
A. 180 gm glucose in 1 litre water
B. 90 gm glucose in 1 litre water
C. 18 gm glucose in 1 litre water
D. 3.6 gm glucose in 1 litre water

Question 98: According to Roault's law
A. relative lowering of V.P. is equal to mole fraction of solute
B. the lowering of V.P. is directly proportional to the mole fraction of solute
C. V.P. of a solvent above a solution is equal to product of V.P. of pure solvent and mole fraction of solvent in solution
D. all the above

Question 99: Which pair of mixture is called idea solution

A. nicotine–water
B. chlorobenzene & bromobenzene
C. water–ether
D. water–alcohol

Question 100: The PH of oranges is

A. 3.5
B. 3.1
C. 4.6
D. 4.2

STAY POSITIVE.
STAY FIGHTING.
STAY BRAVE.
STAY AMBITIOUS.
STAY FOCUSED.
STAY STRONG.

https://chat.whatsapp.com/Fvbc1DYaML26P6PwWxiOkS

ANSWER KEY

1	A	26	A	51	A	76	B
2	C	27	D	52	D	77	A
3	B	28	A	53	A	78	D
4	A	29	C	54	A	79	A
5	A	30	B	55	D	80	A
6	B	31	D	56	C	81	C
7	D	32	D	57	C	82	A
8	B	33	B	58	B	83	A
9	C	34	B	59	D	84	B
10	C	35	D	60	A	85	A
11	D	36	B	61	C	86	C
12	A	37	B	62	C	87	B
13	C	38	D	63	B	88	B
14	A	39	C	64	A	89	A
15	C	40	B	65	A	90	C
16	B	41	C	66	C	91	C
17	D	42	A	67	A	92	D
18	D	43	B	68	C	93	D
19	A	44	C	69	C	94	B
20	D	45	C	70	A	95	D
21	C	46	D	71	B	96	B
22	C	47	D	72	D	97	A
23	B	48	B	73	A	98	D
24	B	49	C	74	C	99	B
25	D	50	B	75	A	100	A

22	Simply use the differentiation concept
24	Since the **maximum power of the function is 3 the possible solutions are 3**
25	**A function for which every element of the range of the function corresponds to exactly one element of the domain is One-to-one.** a function f from a set X to a set Y is subjective (or onto), or a surjection, if for every element y in the codomain Y of f there is at least one element x in the domain X of f such that f(x) = y.
27	The answer is required to be the inverse relation of **what is given which is x > y hence the inverse is y > x**
28	Non-Negativity Constraints. **The linear inequalities x>=0 and y>=0. These are included because x and y are usually the number of items produced and you cannot produce a negative number of items, the smallest number of items you could produce is zero.**
29	Solution Satisfies equations and inequalities.
30	Putting the given points in the given inequalities to find out the answer
31	Integrate **using U substitution**
32	The integral of 0 is C, because the derivative of C is zero.
33	Since the answer to w is not reflecting any part of the imaginary portion hence the z has to lie on the real axis
35	Since the bounds are the same, **the value of the definite integral is 0.**
36	The partial fraction decomposition or partial fraction expansion of a rational function

	(that is, a fraction such that the numerator and the denominator are both polynomials) is an operation that consists of expressing the fraction as a sum of a polynomial (possibly zero) and one or several fractions with a simpler denominator.
37	The given scenario is a **determinant**
38	The period is the distance required for the function to complete one full cycle. For the sine function, the amplitude is given by and the period is defined as . **The same is true for a cosine function.**
39	Since the area of a triangle in circumradius is $\Delta = \frac{abc}{4R}$, the solution is easily derivable
41	Differentiate using trigonometric identities, also the differential for e is e
42	Using Formula: $C = 2\pi r$, where r = 3
44	**Property of direction cosines**. The sum of the squares of the direction cosines is equal to one.
45	Fill in the given point in the equation. The points which satisfy the equation is your answer
46	Usually given by $product\ of\ the\ roots = -\frac{c}{a}$
47	Since the last term **does not contain any x or the power of x in the last term is 0**
49	The Geometric Mean is a special type of average where **we multiply the numbers together and then take a square root (for two numbers), cube root (for three numbers) etc.**
50	If **the group operation is called multiplication then 1 can be a notation** for the trivial group.
51	**When a gas is trapped inside a container which has a fixed size (its volume cannot change) and the gas is heated, the particles will gain kinetic energy which will make them move faster. The temperature of the gas is proportional to the average kinetic energy of its molecules.** Faster moving particles will collide with the container walls more frequently and with greater force. This causes the force on the walls of the container to increase and so the pressure increases.
52	**Permeability is the inductance per unit length**. In SI units, permeability is measured in henries per metre
53	Its SI units are newtons per coulomb ($N \cdot C^{-1}$) or, equivalently, volts per metre ($V \cdot m^{-1}$), which in terms of SI base units are kg·m·s−3·A−1 , Electric field There is analogy to the steepness of the slope (in gravitational field) on each you place a mass.
54	**If the surface is placed parallel to the electric field then no electric lines of force will pass through the surface.**
55	**The current through a parallel branch is inversely proportional to the amount of resistance of the branch.** The total power consumed in a parallel circuit is equal to the sum of the power consumed by the individual resistors.
56	When two or more vectors are added together, **the resulting vector is called the resultant it obeys Commutative law for addition & Associative law for addition.**
57	Newton's third law states that every action must have an equal and opposite reaction. **In swimming, when the hands and feet push against the water, the water pushes back on the swimmer and propels the swimmer forwards.**
58	**Transistors act as amplifiers. Amplifiers produce gain while filters alter the amplitude and/or phase characteristics of an electrical signal with respect to its frequency.** As these amplifiers and filters use resistors, inductors, or capacitor networks (RLC)

	within their design, there is an important relationship between the use of these reactive components and the circuits frequency response characteristics.
59	**In One Dimensional Elastic Collision Bodies of Equal Masses Exchange their Velocities. It means after the collision final velocity of the second body is the initial velocity of the first body and the final velocity of first body is the initial velocity of the second body.**
60	Because since there is no resistance the bodies will be acted upon by the gravity only causing the acceleration to be $9.8\frac{m}{s^2}$
61	The only gravity strong enough for us to feel comes from the Earth's mass, which is why we feel a downward pull on the surface. **At the center of the Earth, the situation is different. Because Earth is nearly spherical, the gravitational forces from all the surrounding mass counteract one another.**
63	It is not caused by the attraction to the Earth but is instead caused by acceleration or centrifugal force. There is a need for artificial gravity in spacecraft to counter the effect of weightlessness on the astronauts. **A rotating circular space station can create artificial gravity for its passengers.**
64	The longer the pendulum, the more time it takes to go through its cycle. **The pendulum and clock are matched so that the clock marks a certain number** of **seconds for a precise number of swings.**
65	**Soldiers crossing a long bridge must "break stride," or not march in unison,** to **stop such a situation from occurring again.**
66	**Acoustics is the branch of physics that deals with the study of all mechanical waves in gases, liquids, and solids including topics such as vibration, sound, ultrasound and infrasound.**
67	Gamma rays **have the shortest wavelengths, < 0.01 nanometers** (about the size of an atomic nucleus).
68	**Molecules at higher temperatures have more energy, thus they can vibrate faster. Since the molecules vibrate faster, sound waves can travel more quickly.** The speed of sound in room temperature air is 346 meters per second.
69	**When Oil is dropped on the road during a rainy day, a thin layer of oil will appear on the water surface. Both the top and bottom surfaces of this oil film can reflect light.** ... The wavelength corresponding to the constructive interference also differs and this causes the reflected light to have various colours.
70	**Fresnel diffraction or near-field diffraction** is a process of diffraction that occurs when a wave passes through an aperture and diffracts in the near field, causing any diffraction pattern observed to differ in size and shape, depending on the distance between the aperture and the projection.
71	**Chromatic aberration**, also known as "color fringing" or "purple fringing", is a common optical problem that occurs when a lens is either unable to bring all wavelengths of color to the same focal plane, and/or when wavelengths of color are focused at different positions in the focal plane.
72	Mirage is formed for **total internal reflection.** The air above the soil is the warmest and so has rarer refractive index compared to the layers above. When sunlight falls on the ground, effectively it passes through several such layers where the incident light goes from denser to rarer medium. Once the critical angle of incidence is reached, the refraction stops and reflection happens.
73	**A radioactive tracer, or radioactive label,** is a chemical compound in which one or more atoms have been replaced by a radionuclide so by virtue of its radioactive decay

	it can be used to explore the mechanism of chemical reactions by tracing the path that the radioisotope follows from reactants to products.
74	**These droplets are visible as a "cloud" track that persist for several seconds while the droplets fall through the vapor.** These tracks have characteristic shapes. For example, an alpha particle track is thick and straight, while an electron track is wispy and shows more evidence of deflections by collisions.
75	**Critical mass, in nuclear physics**, the minimum amount of a given fissile material necessary to achieve a self-sustaining fission chain reaction under stated conditions.
76	**Nuclear binding energy** is used to determine whether fission or fusion will be a favorable process. The mass defect of a nucleus represents the mass of the energy binding the nucleus, and is the difference between the mass of a nucleus and the sum of the masses of the nucleons of which it is composed.
77	Louis de Broglie suggested that just as light exhibits wave and particle properties, all microscopic material particles such as electrons, protons, atoms, molecules etc. have also dual character. They behave as a particle as well as wave. This means that an electron which has been regarded as a particle also behaves like a wave. Thus, **according to de Broglie,all the material particles in motion possess wave characteristics.**
78	**X-Rays have the same wavelength as Gamma Rays.**
80	Pair production is the creation of a subatomic particle and its antiparticle from a neutral boson. Examples include creating an electron and a positron, a muon and an antimuon, or a proton and an antiproton.
81	In 1 Mole of SO2, No of oxygen atoms = 2*6.022 * 10 ^ 23 = 12.044 * 10 ^ 23 while no . Of sulphur atoms = 1*6.022 * 10 ^ 23 = 6.022 * 10 ^ 23
82	**The insoluble impurities in the saturate solution are then removed by filtering thehot saturated, through a normal or a fluted filter paper.** This avoids the premature crystallization of eh solute on the filter paper or in the funnel stem. If necessary,hot water funnel should be used for this purpose.
83	Chromatography as a term was introduced by the Russian scientist Tswett, **who separated plant pigments on a column containing calcium carbonate. It was based on the Greek word for color—"chromatos" and "graphein"—to write, together meaning "writing with color".**
84	As the molar mass of a substance increases, rate of diffusion decreases. Molar mass of NH3 is 17.031 g/mol and that of CO2 is 44.01 g/mol and that of SO2 is 64.066 g/mol and that of Cl2 is 70.906 g/mol so the dffusion rate will be in this order **NH3 > CO2 > SO2 > Cl2** .
85	Considering ***PV=nRT*** , V=nRT/P, in order to prevent volume from expanding the temerature is decreased and pressure is increased.
86	For density, unit used is often grams per cubic decimeter (g / dm3 or g.dm-3)
87	Boiling and melting points increase as you go down the group. This is because the strength of the van der Waals forces increases since the atoms have more electrons as you descend the group.
89	**Allotropy or allotropism** is the property of some chemical elements to exist in two or more different forms, in the same physical state, known as allotropes of the elements.
90	Rutherford's model of atom failed because it could not explain the stability of an atom

	because it was assumed that electrons while revolving in a circular path release energy and the revolving electrons will lose energy and finally fall into the nucleus. Due to this, the model was unable to prove atom stable.
91	The octet rule refers to the tendency of atoms to prefer to have eight electrons in the valence shell (outer orbital). When atoms have fewer than eight electrons. Notable exceptions are aluminum and boron, which can function well with six valence electrons. Consider BF_3. The boron shares its three electrons with three fluorine atoms. The fluorine atoms follow the octet rule, but boron has only six electrons. BF_3 is stable, but it will form BF_4^- when possible. Most elements to the left of the carbon group have so few valence electrons that they are in the same situation as boron: they are electron deficient. Electron deficient elements often show metallic rather than covalent bonding.
92	The enthalpy of neutralization for all strong acid-strong base reactions should be the same within experimental error because all those reactions are in simple terms, **$H^+ + OH^- = H_2O$**. Although the enthalpy of neutralization for all strong acid-strong base reactions are within experimental error, that is not the case of weak acid-strong base reactions. This is not the case because weak acids do not completely dissociate into ions like strong acids do. Therefore the enthalpy of weak acid-strong base reactions is less than the enthalpy of strong acid-strong base reactions.
93	The property of a buffer solution to resist any change in its pH value even when small amount of the acid or the base are added to it is called Buffer action. Buffer action can be explained by "common ion effect"(The common-ion effect states that in a chemical solution in which several species reversibly associate with each other by an equilibrium process, increasing the concentration of any one of its dissociated components by adding another chemical that also contains it will cause an increased amount of association) , "law of mass action"(the law of mass action is the proposition that the rate of a chemical reaction is directly proportional to the product of the activities or concentrations of the reactants. It explains and predicts behaviors of solutions in dynamic equilibrium) , "Le–Chatlier's principle" (a principle stating that if a constraint (such as a change in pressure, temperature, or concentration of a reactant) is applied to a system in equilibrium, the equilibrium will shift so as to tend to counteract the effect of the constraint).
94	**Kc = [Concentration of product]/[Concentration of reactant]**
95	When salt is added, the equilibrium will be reached, and kept at the lower temperatures required. But when salt comes into contact with the ice on the road some heat is released because of the solvation process. This melts the ice yielding once again an ice water equilibrium. But because of the presence of salt this mixture will re-freeze at lower temperatures

96	Some salts, when crystallised from aqueous solution, incorporate water molecules into the structure. This is known as 'water of crystallisation'.The no. of water of crystallization of MgCl2 is 6 .MgCl2.6H2O is very hygroscopic chemical and it quickly converted from solid to liquid phase.
98	It states that the partial vapor pressure of each component of an ideal mixture of liquids is equal to the vapour pressure of the pure component multiplied by its mole fraction in the mixture. In consequence, the relative lowering of vapour pressure of a dilute solution of nonvolatile solute is equal to the mole fraction of solute in the solution.
99	An ideal solution is formed when two component which are used to form solution have almost similar interaction.Ideal solution follow Raoult's law at all constructions.So no new interaction is developed in solution after mixing hence no change of enthalpy & volume is observed in solution. When chlorobenzene & bromobenmzene are mixed ,no new interaction is develop in solution as chlorobenzene & bromobenzene have almost similar constituents & have similar polarities.So,there is no change in enthalpy & volume of solution after mixing.It gives ideal solution on mixing.
100	The pH of orange juice ranges from 3.3 to 4.2.

Work harder than you think you did yesterday.

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Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practice.

Read the following passage and answer the questions given at the end.

Questions 1 – 5:

From the 197 million square miles, which make up the surface of the globe, 71 per cent is covered by the interconnecting bodies of marine water; the Pacific Ocean alone covers half the Earth and averages near 14,000 feet in depth. The portions which rise above sea level are the continents-Eurasia, Africa; North America, South America, Australia, and Antarctica. The submerged borders of the continental masses are the continental shelves, beyond which lie the deep-sea basins. The ocean are deepest not in the center but in some elongated furrows, or long narrow troughs, called deeps. These profound troughs have a peripheral arrangement, notably around the borders of the pacific and Indian oceans. The position of the deeps, like the highest mountains, are of recent origin, since otherwise they would have been filled with waste from the lands. This is further strengthened by the observation that the deeps are quite often, where world-shaking earthquakes occur. To cite an example, the "tidal wave" that in April, 1946, caused widespread destruction along Pacific coasts resulted from a strong earthquake on the floor of the Aleutian Deep. The topography of the ocean floors is none too well known, since in great areas the available soundings are hundreds or even thousands of miles apart. However, the floor of the Atlantic is becoming fairly well known as a result of special surveys since 1920. A broad, well-defined ridge-the Mid-Atlantic ridge-runs north and south between Africa and the two Americas and numerous other major irregularities diversify the Atlantic floor. Closely spaced soundings show that many parts of the oceanic floors are as rugged as mountainous regions of the continents. Use of the recently perfected method of submarine topography. During World War II great strides were made in mapping submarine surfaces, particularly in many parts of the vast Pacific basin. Most of the continents stand on an average of 2870 feet above sea level. North America averages 2300 feet; Europe averages only 1150 feet; and Asia, the highest of the larger continental subdivisions, averages 3200 feet. Mount Everest, which is the highest point in the globe, is 29,000 feet above the sea; and as the greatest known depth in the sea is over 35,000 feet, the maximum relief (that is, the difference in altitude between the lowest and highest points) exceeds 64,000 feet, or exceeds 12 miles. The continental masses and the deep-sea basins are relief features of the first order; the deeps, ridges, and volcanic cones that diversify the sea floor, as well as the plains, plateaus, and mountains of the continents, are relief features of the second order. The lands are unendingly subject to a complex of activities summarized in the term erosion, which first sculptures them in great detail and then tends to reduce them ultimately to sea level. The modeling of the landscape by weather, running water, and other agents is apparent to the keenly observant eye and causes thinking people to speculate on what must be the final result of the ceaseless wearing down of the lands. Much before there was any recognizable science as geology, Shakespeare wrote "the revolution of the times makes mountains level."

Question 1: The peripheral furrows or deeps are found

A. only in the pacific and Indian oceans

B. near earthquakes
C. near the shore
D. in the center of the ocean

Question 2: The largest ocean is the

A. Aleutian deep
B. pacific
C. Atlantic
D. arctic

Question 3: We may conclude from this passage that earth quakes

A. Occur more frequently in newly formed land or sea formations
B. Are caused by the weight of the water
C. Cause erosion
D. Occur in the deeps

Question 4: The highest mountains are

A. in excess of 12 miles
B. near the deeps
C. relief features of the first order
D. oldest

Question 5: The highest point on North America is

A. 2870 feet above sea level
B. not mentioned in the passage
C. higher than the highest point in Europe
D. 2300 feet above sea level

Question 6: That the Third Battalion's fifty percent casually rate transformed its assault on Hill 306 from a brilliant stratagem into a debacle does not ______ eyewitness reports of its commander's extraordinary____in deploying his forces.

A. invalidate - brutality
B. Gainsay – cleverness.
C. underscore - ineptitude
D. justify – rapidity

Question 7: In eighth-century Japan, people who _______ wasteland were rewarded with official ranks as part of an effort to overcome the shortage of____ fields.

A. cultivated - domestic
B. located - desirable
C. conserved - forested
D. reclaimed – arable

Question 8: Melodramas, which presented stark oppositions between innocence and criminality, virtue and corruption, good and evil, were popular precisely because they offered the audience a world___ of ___

A. deprived - polarity
B. full - circumstantiality
C. bereft - theatricality
D. devoid – neutrality

Question 9: Having fully embraced the belief that government by persuasion is preferable to government by ____ the leaders of the movement have recently ___ most of their previous statements supporting totalitarianism.

A. proclamation - codified
B. coercion – repudiated
C. participation - moderated
D. intimidation - issued

Question 10: Many philosophers agree that the verbal aggression of profanity in certain radical newspapers is not _____or childish, but an assault on ____ essential to the revolutionary's purpose.

A. insolent - sociability
B. trivial – decorum
C. belligerent - fallibility
D. serious - propriety

Write antonyms of the following:
Question 11: OROTUND :

A. not resonant
B. not reddish
C. not eager
D. pompous

Question 12: FULMINATION :

A. praise
B. repetition
C. escape
D. ratification

Question 13: SQUALID

A. fervid
B. florid
C. pristine
D. extraneous

Question 14: PERFIDY

A. tact
B. generosity

C. thoroughness
D. loyalty

Question 15: FERVID

A. undistinguished
B. unexpected
C. stubborn
D. restrained

Choose the correct Analogies.

Question 16: LULLABY : BARCAROLE

A. birth : marriage
B. night : morning
C. cradle : gondola
D. song : poem

Question 17: LURK : WAIT

A. boost : elevate
B. deplete : drain
C. abscond : depart
D. bilk : cheat

Question 18: PARENTHESIS: EXPLANATION

A. ellipsis : omission
B. asterisk : exaggeration
C. synopsis : affectation
D. apostrophe : annotation

Question 19: SAND PAPER: ABRASIVE

A. gasoline : refined
B. grativity : irritant
C. polish : floors
D. oil : lubricant

Question 20: RIG: CONTEST

A. solve : conundrum
B. predict : race
C. repudiate : thesis
D. gerrymander : district

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 21: The population of a town increases geometrically at the rate of 4% per year. If the present population is 100,000, then population after 4 years will be

- **A.** $100{,}000\,(1 + .04)^3$
- **B.** $100{,}000\,(1 + .04)^4$
- **C.** $100{,}000\,(1 - 0.04)^3$
- **D.** $100{,}000\,(1 - 0.04)$

Question 22: Which of the following series is convergent.

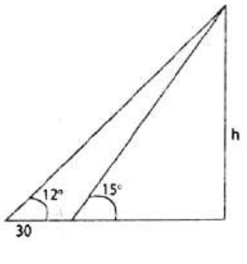
- **A.** 2 – 6 + 18 - ......
- **B.** 8 + 4 + 2 + ...
- **C.** 5 + 10 + 20 + ...
- **D.** 3/2 + 3 + 6 + ...

Question 23: A function f(x) is said to be the periodic function if, for all x in the domain of f, here exists a smallest positive number p such that f(x + p) =

- **A.** f(p)
- **B.** f(x)
- **C.** 0
- **D.** P

Question 24: The value of h is

- **A.** 15.3
- **B.** 30.3.
- **C.** 60.3
- **D.** 120.3



Question 25: abc (sin β + sinγ) =

- **A.** 4ΔR
- **B.** 4Δs
- **C.** 4Δr
- **D.** 4rs

Question 26: a circle drawn inside a triangle and touching its sides is called the

- **A.** Circum circle

- **B.** In circle
- **C.** Escribed circle
- **D.** Normal

Question 27: $a^{2n} - b^{2n}$ is always divisible by (a+b) for all values of n ≥ ______.

- **A.** 1
- **B.** 2
- **C.** 4
- **D.** None of these

Question 28: If n is odd, then number of middle term(s) in the expansion of (a+b)n is/are.

- **A.** two
- **B.** one
- **C.** three
- **D.** none of these

Question 29: The number of possible permutations of the letters of the word, "ADDING" having two D'S together.

- **A.** 5!
- **B.** 3!
- **C.** 4!
- **D.** 25

Question 30: Two coins are tossed together once, the probability of getting two head is.

- **A.** $\frac{1}{4}$
- **B.** $\frac{1}{2}$
- **C.** $\frac{1}{8}$
- **D.** 0

Question 31: A sequence is a function whose domain is

- **A.** the set of rational numbers
- **B.** The set of irrational numbers
- **C.** The set of integers
- **D.** The set of natural numbers

Question 32: In a proposition if p→ q then q → p is called

- **A.** inverse of p→ q
- **B.** converse of p→ q
- **C.** contrapositive p→ q
- **D.** none

Question 33: If set is a group with respect to addition then the number of identity elements in S is

- **A.** Unique
- **B.** Two
- **C.** Three
- **D.** None

Question 34: The value of determinant of the matrix $\begin{matrix} 1 & 3 & 5 \\ 7 & 9 & 11 \\ 13 & 15 & 17 \end{matrix}$ is

- **A.** 0
- **B.** 1
- **C.** 2
- **D.** 3

Question 35: The elements of a matrix can _______ the complex numbers or imaginary numbers.

- **A.** not be
- **B.** be
- **C.** sometime
- **D.** none of these

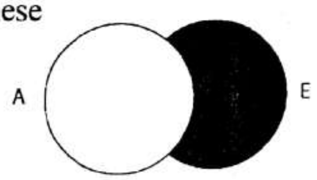
Question 36: If $3^{1+x} + 5.3^{x} - 8 = 0$, then x =

- **A.** 8
- **B.** 5
- **C.** 3
- **D.** 0

Question 37: Two linear equations having two variables have __________.

- **A.** One root
- **B.** Two roots
- **C.** Three roots
- **D.** None of these

Question 38: The magnitude of $\frac{1+2i}{i}$ is _________



- **A.** 5 + 2i
- **B.** -1
- **C.** $\sqrt{3}$
- **D.** None

Question 39: The shade area in the figure represents the set:

- **A.** A ∪ E
- **B.** A ∩ E
- **C.** A – E
- **D.** E – A

Question 40: The sequence $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}$ is

- **A.** Convergent
- **B.** Divergent
- **C.** Maxima

D. Minima

Question 41: $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n =$

A. Natural logarithm
B. e
C. e^2
D. 1

Question 42: If two medians of a triangle intersect at a point (2, 2) then 3rd median will pass through the point

A. (0, 1)
B. (3, 3)
C. (1, 1)
D. (2, 2)

Question 43: $\sqrt{x+\Delta x}$ can be approximated to ___________.

A. $\sqrt{x}-\frac{1}{2\sqrt{x}}\Delta x$
B. $\sqrt{x}+\frac{1}{\sqrt{x}}\Delta x$
C. $\sqrt{x}+\frac{1}{2\sqrt{x}}\Delta x$
D. None of these

Question 44: The values of x obtained by taking f'(x) =0 are called _____________ number(s).

A. stationary
B. critical
C. both B and C
D. none of these

Question 45: The value of $\int_1^3 (x^2+2x)^5\,dx+\int_3^5 (y^2+2y)^5\,dy$ is

A. $\int_1^5 (x^2+2x)^5\,dx$
B. $\int_3^5 (y^2+2y)^5\,dy$
C. $\int_1^3 (y^2+2y)^5\,dy$
D. $\int_1^5 (y^2+2y)^6\,dy$

Question 46: If $g^2+f^2-c=0$ then the circle reduces to

A. a line
B. a point
C. two points
D. none of these

Question 47: The length of the diameter of the circle represented by the equation $2x^2 + 2y^2 - 8 = 0$, is

- **A.** 8
- **B.** 4
- **C.** 2
- **D.** 16

Question 48: The equation of the latus rectum of the parabola $y^2 = -16x$ is

- **A.** $x = 4$
- **B.** $y = -4$
- **C.** $y - 4 = 0$
- **D.** $x + 4 = 0$

Question 49: If $\bar{a}$ is a unit vector then the value of $\bar{a}.\bar{b}$ is

- **A.** 1
- **B.** $\overline{|a|}.\cos\theta$
- **C.** $\overline{|b|}.\cos\theta$
- **D.** 0

Question 50: The distance from the origin to the plane

- **A.** 7
- **B.** 0
- **C.** 1
- **D.** 2

NEVER GIVE UP
BECAUSE GREAT THINGS
TAKE TIME

Section (III):

Physics (Questions 51-80)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 51: Caloric is the:

- **A.** Hypothetical weightless fluid
- **B.** Imaginary concept of energy
- **C.** Energy
- **D.** Molecular motion

Question 52: Molecules of which gas, Oxygen or Nitrogen in air will move fast at some particular temperature:

- **A.** Molecules of both gases will move with same Velocities
- **B.** Oxygen
- **C.** Nitrogen
- **D.** None of these

Question 53: Two equal masses of an ideal gas at same temperature and pressure are compressed to half of their volumes, one of them isothermally and the other adiabatically. Which one of the following would be same for both?

- **A.** The internal energy of the compressed gases
- **B.** Heat given out during compression
- **C.** Temperature of the compressed gases
- **D.** None of these

Question 54: Increase in length per unit length per degree rise in temperature of aluminum rod of 10m is 24 x 10- 6 /C. What would be the increase in volume per unit volume per degree rise in temperature of a cube of aluminum of volume 100m3 when both are heated through the same range of temperature?

(a) 72 x 10^{-6}/C

(b) 7.2 x 10^{-3}/ °C

(c) 24 x 10^{-6}/C

(d) 2.4 x 10^{-3}/ °C

Question 55: The magnitude of electrostatic force does not depend upon:

- **A.** Magnitude of the charges
- **B.** Medium between the charges
- **C.** Distance between the charges
- **D.** Nature of the charges

Question 56: Electric field at the center of square when 1μC charge is placed at its each corner is:

- **A.** Zero
- **B.** 2 Volt/m

C. $\sqrt{2}$ Volt /m
D. 4 Volt/m

Question 57: Total potential difference across the combination of three cells becomes maximum when:

A. They are connected in parallel
B. They are connected in series
C. Two cells are connected in parallel and one in series
D. Two cells are connected in series and one in parallel

Question 58: The magnetic flux through a surface will be minimum when angle between B and ΔA is:

A. 0^o
B. 45^o
C. 60^o
D. 90^o

Question 59: A magnet is introduced onto the coil and a voltage is induced across the coil. Which of the following factor has no effect on the induced voltage?

A. Thickness of the wire of the coil
B. The strength of the magnetic field
C. The time in which magnet is introduced
D. Number of turns of the coil

Question 60: Whenever a potential is applied across the P-n junction diode so as to increase the height of the Potential barrier, the diode is said to be:

A. Choked
B. Both reverse and forward biased
C. Forward biased
D. Reverse biased

Question 61: $\aleph_{max}$is the:

A. Wave length of maximum energy
B. Maximum wave length of radiation
C. Wave length of minimum energy
D. All of those

Question 62: Which of the following is not true for antiparticle of electron?

A. It follows mass-energy relation
B. It possess the same charge as that of electron
C. It possess the same momentum as that of electron
D. Its charge to mass ratio is the same as that of electron

Question 63: When the frequency of incident radiation is doubled above threshold frequency then the velocity of photoelectron will be:

A. Remain same
B. Doubled
C. Halved
D. Increase

Question 64: The most stablc state of yuby is:

A. Ground state
B. Meta state
C. Higher state
D. Excited state

Question 65: Electric field generator in G.M tube is due to

A. Ionization of alcohol
B. Low vapor pressure of alcohol
C. Low boiling point of alcohol
D. All of these

Question 66: Steradian is the angel which lies in:

A. One dimension
B. Two dimensions
C. Three dimensions
D. None

Question 67: Which is a correct record for the diameter of wire when measured by a screw gauge of least count 0.001 cm:

A. 2.3 cm
B. 2.31 cm
C. 2.312 cm
D. 2.3124 cm

Question 68: When a vector is multiplied by a negative number its direction.

A. is reversed
B. remains unchanged
C. make and angle of 60°
D. may be changed or not

Question 69: The coefficient of frictional force between two surfaces in contact does NOT depend upon.

A. The normal force passing one against the other
B. The area of surfaces
C. Whether the surfaces are stationary or in relative motion
D. whether a lubricant is used or not

Question 70: A ball is thrown at 40 m/s with the angle of projection of 30o with the horizontal, the vertical velocity, of the projectile after 1 sec.

A. 20 m/s
B. 15 m/s
C. 10 m/s
D. Zero

Question 71: The center of gravity of a body of irregular shape lies:

A. At its center
B. At its intersection of medians
C. At the intersection of diagonals
D. At the surface of the body

Question 72: When a lift is moving upward with a uniform velocity, the apparent weight of a body inside the lift will be.

A. Equal to its actual weight
B. Less than the actual weight
C. More than the actual weight
D. Zero

Question 73: The example of negative work is:

A. Work done under a conservative force
B. Work done perpendicular to a conservation force
C. Work done against friction,
D. Work done against gravity

Question 74: If a second pendulum is taken up on the moon, in order to have its time period same:

A. The length of the pendulum must be increased
B. The length of the pendulum must be decreases
C. The length of the pendulum must be kept the same
D. None of the above

Question 75: If the two sound waves produced beats, it is necessary that the two have.

A. The same frequencies
B. Slightly different frequencies
C. Slightly different amplitudes
D. The same time period

Question 76: The bodies travel at velocities greater than velocity of sound in air are called.

A. Ultrasonic
B. Infrasonic
C. Supersonic
D. Revelberator

Question 77: Which of the following phenomenon produce the colors in soap bubble?

A. Interference

B. Polarization
C. Diffraction
D. Dispersion

Question 78: The characteristic property of light wave which does not vary with the medium is:

A. Frequency
B. Amplitude
C. Velocity
D. Wave

Question 79: A terrestrial telescope can be made by adding an erecting lens to a

A. Prism spectroscope
B. Reflecting telescope
C. Field telescope-
D. Astronautically telescope

Question 80: Long sightedness can be cured by.

A. Convex lens
B. Concave lens
C. Cylindrical lens
D. Bifocal lens

Section (IV):

Chemistry (Questions 81-100)

==> THIS SECTION IS ONLY FOR CANDIDATES APPLYING IN MS CHEMISTRY

Question 81: Deep sea divers breathe mixture of nitrogen and oxygen in a ratio of:

A. 96% N_2 and 4% O_2
B. 4% and N_2 and 96% O_2
C. 80% N_2 and 20% O_2
D. 20% N_2 and 80% O_2

Question 82: The value of compressibility factor for an ideal gas is equal to:

A. 1
B. 1.5
C. 2
D. 2.5

Question 83: Which of the following is a pseudo-solid

A. CaF2
B. Glass
C. NaCl
D. All

Question 84: Why is the boiling point of methane greater than that of neon?

- **A.** a molecule of methane has a greater mass
- **B.** a molecule of methane has more electrons than a molecule of neon
- **C.** the molecules of methane have stronger intermolecular forces than those of neon
- **D.** the molecule of methane is polar but that of neon is not

Question 85: The energy associated with an electron resolving in first orbit is

- **A.** 2.178×10^{-18} k J/mol
- **B.** 1313.31 k J/mol
- **C.** 328.32 k J/mol
- **D.** 82.08 k J/mol

Question 86: x + l value for 3d will be

- **A.** 3
- **B.** 4
- **C.** 5
- **D.** 6

Question 87: Standard enthalpy of Al_2O_3 cannot be measured because

- **A.** it does not catch fire
- **B.** it reacts with CO_2
- **C.** protective layer of oxide cover the surface
- **D.** none of above

Question 88: In a chemical reaction, equilibrium is said to have established when

- **A.** opposing reactions stops
- **B.** concentrations of reactants and products are equal
- **C.** rate constants of opposing reactions are equal
- **D.** None of these

Question 89: Which of the following mixtures of liquids show negative deviation

- **A.** ethyl alcohol ether
- **B.** HCl and water
- **C.** phenol – water
- **D.** chlorobenzene – bromobenzene

Question 90: Large no. of isotopes are known for the elements whose masses are multiple of

- **A.** two
- **B.** four
- **C.** six

D. eight

Question 91: Pressure remaining constant at which temperature the volume of gas will become twice of what it is at 0C.

A. 546 °C
B. 200 °C
C. 546 K
D. 273 K

Question 92: Gases deviate from ideal behaviour at high pressure. Which of the following is correct for non–ideality?

A. At high pressure, the gas molecules move in one direction only
B. At high pressure, the collisions between, the gas molecules are increased manifold
C. At high pressure, the volume of gas becomes insignificant
D. AT high pressure, the intermolecular attractions, become significant

Question 93: Exceptionally low acidic strength of HF is due to

A. strong polar bond
B. small size of fluorine
C. strong hydrogen bonding
D. Vander Waal's forces

Question 94: The charge on electron was determined by

A. J.J. Thomson
B. Millikan.
C. Rutherford
D. Bohr

Question 95: Which of the following ions has larger ionic radius?

A. Na^{+}
B. K^{+}
C. Mg^{2+}
D. Al^{3+}

Question 96: If an endothermic reaction is allowed to take place very rapidly in the air. The temperature of the surrounding air

A. remains constant
B. increase
C. decrease
D. remain unchanged

Question 97: A basic Buffer solution can be prepared by mixing

A. weak acid and its salt with strong base
B. strong acid and its salt with weak base
C. weak base and its salt with strong acid

D. strong base and its salt with weak acid

Question 98: Molarity of pure water is

A. 1
B. 18
C. 55.5
D. 6

Question 99: Aqueous solution of methanol is zeotropic mixture because

A. it does not obey the Roalt`s law
B. mixture cannot be separated by sublimate
C. mixture can be separated by distillation
D. greater volume than the volume of component

Question 100: Colligative properties are the properties of solution that depends upon

A. nature of molecules
B. quality
C. physical property
D. no. of molecules

**NO MATTER HOW
MANY MISTAKES YOU
MAKE OR HOW SLOW YOU
PROGRESS,YOU ARE STILL
WAY AHEAD OF EVERYONE
WHO ISN'T TRYING.**

Tony Robbins

ANSWER KEY

1	A	2			D	76	C
2	C	27	A	52	C	77	A
3	A	28	B	53	A	78	A
4	D	29	A	54	A	79	D
5	A	30	C	55	D	80	A
6	B	31	D	56	A	81	A
7	D	32	B	57	B	82	A
8	D	33	A	58	D	83	B
9	B	34	A	59	A	84	C
10	B	35	B	60	D	85	B
11	A	36	D	61	A	86	C
12	A	37	B	62	B	87	C
13	C	38	C	63	D	88	C
14	D	39	D	64	B	89	B
15	D	40	A	65	B	90	B
16	C	41	B	66	C	91	C
17	C	42	D	67	C	92	D
18	A	43	C	68	A	93	C
19	D	44	C	69	B	94	B
20	D	45	A	70	C	95	B
21	B	46	B	71	A	96	C
22	B	47	B	72	A	97	A
23	B	48	D	73	C	98	C
24	B	49	C	74	B	99	C
25	B	50	C	75	B	100	D

21	**(1+.04) represent the increase in % where as the power 4 represent the years of compounding or number of years)**
22	Since **the series and the decrease in the series are becoming same as the number of terms are increasing**
26	In geometry, the incircle or inscribed circle of a triangle is the largest circle contained in the triangle; it touches (is tangent to) the three sides. **The center of the incircle is a triangle center called the triangle's incenter.**
27	Because **if less than 1 the numerator will become indivisible to (a+b)**
28	**Because a single number will bifurcate the whole series of number is two equal portions**
30	**There are two chances of favourable outcomes(heads) and four total number of outcomes. (number of fav.. Outcomes/total number of outcomes).**
31	A sequence is a function whose domain is the set of natural numbers or a subset of the natural numbers.
32	A conditional statement is logically equivalent to its contrapositive. **Converse: Suppose a conditional statement of the form "If p then q" is given. The converse is "If q then p."**
33	Uniqueness of the identity element. An important fact in mathematics is that whenever a binary operation on a set has an identity, the identity is unique; no other element as the set serves as the identity. This ensures that zero and one are unique

	within the number system.
34	Using the rules of determinants
35	**A matrix can contain any sorts of complex or imaginary numbers**
39	Since the Shaded area only caters is E only means and does not not include the point of intersection **and A hence it represents E-A**
40	Since the series and the increase in the series are becoming same as the number of terms are increasing
42	All medians of the triangle intersect at the same point.
46	Adjusting the given equation for the circle you can get the slope intercept for y=mx+c which which is a eqation of a line
47	**For this equation r=2 and hence since diameter is 2r the length of diameter is 4**
48	**4a=16 solve for a**
49	Since a is a unit vector mean only direction will affect the resultant hence when multiplies by b using $\boldsymbol{a.bCosQ}$ the answer will be $\boldsymbol{bCosQ}$
51	The caloric theory is an obsolete scientific theory that heat consists of a self-repellent fluid called caloric that flows from hotter bodies to colder bodies. Caloric was also thought of as a weightless gas that could pass in and out of pores in solids and liquids.
52	**Nitrogen and oxygen exist as diatomic molecules naturally. If you calculate the molar mass of both gases, oxygen has a molar of 32g/mol and nitrogen has a molar mass of 28g/mol.** The lighter the gas the faster it moves. Nitrogen is lighter than oxygen. Thus, it moves faster.
53	Internal energy changes in an ideal gas may be described solely by changes in its kinetic energy. Kinetic energy is simply the internal energy of the perfect gas and depends entirely on its pressure, volume and thermodynamic temperature. Also An ideal gas by definition has no interactions between particles, no intermolecular forces, so pressre change at constant temperature does not change internal energy. Real gases have intermolecular interactions, attractions between molecules at low pressure and repulsion at high pressure. Their internal energy changes with change in pressure, even if temperature is constant. For an ideal gas, in an isothermal process, $\boldsymbol{\Delta U=0=Q-W}$**, so** $\boldsymbol{Q=W}$**.**
54	Using Formula: $\boldsymbol{dV = V0 * \beta * (t1 - t0)}$, where β is the volumetric temperature expansion coefficient which for aluminium is 69x10^-6
55	The magnitude of the electrostatic force of attraction or repulsion between two point charges is directly proportional to the product of the magnitudes of charges and inversely proportional to the square of the distance between them.
56	Force of repulsion between charges placed at corner A and centre O is equal in magnitude but opposite in direction relative to the force of repulsion between the charges placed at corner C and centre O. Hence, they will cancel each other. Similarly, force of attraction between charges placed at corner B and centre O is equal in magnitude but opposite in direction relative to the force of attraction between the charges placed at corner D and centre O. Hence, they will also cancel each other. Therefore, net force caused by the four charges placed at the corner of the square on 1 μC charge at centre O is zero.
57	SERIES: In series connection the total voltage supplied by 2 cells is addition of voltages of each cell.

	$I=\frac{2V}{R}$ **R=Load** **PARALLEL:** **In parallel connection The total voltage supplied by 2 cells will be V** **So current will be V/R.** **CONCLUSION:Current is maximum in series connection.** The advantage of connecting cells in series is that u can supply more voltage.
58	The smaller cosθ is, and thus flux will decrease accordingly.
59	Michael Faraday did experiments that showed that induced e.m.f for a coil of wire depends on four things: Magnetic strength of the core in the coil of wire. **(stronger --> bigger emf)** Number of turns of wire in the coil **(more turns --> bigger emf)** The cross-sectional area of the coil **(bigger area --> bigger emf).** (This could also be seen as the angle you point the magnet at the coil, because flux linkage is basically the same as flux cutting.) How fast you move the magnet into/out of the coil. **(Faster --> bigger emf)**
60	**When the polarity of the battery is such that electrons are allowed to flow through the diode, the diode is said to be forward-biased.** Conversely, when the battery is "backward" and the diode blocks current, the diode is said to be reverse-biased.
62	Every type of particle has an associated antiparticle with the same mass but with opposite physical charges (such as electric charge). For example, the antiparticle of the electron is the antielectron (which is often referred to as positron). While the electron has a negative electric charge, the positron has a positive electric charge, and is produced naturally in certain types of radioactive decay. The opposite is also true: the antiparticle of the positron is the electron.
63	**When the intensity of incident light is doubled it will more photelectrons emitted. Which suggests an increase in velocity**
64	**Metastable state, in physics and chemistry, particular excited state of an atom, nucleus, or other system that has a longer lifetime than the ordinary excited states and that generally has a shorter lifetime than the lowest, often stable, energy state, called the ground state.**
65	The gas used is usually Helium or Argon. **When radiation enters the tube it can ionize the gas. The ions (and electrons) are attracted to the electrodes and an electric current is produced.**
66	The entire sphere has a solid angle of 4πsr. The steradian (symbol: sr) or square radian is the SI unit of solid angle. It is used in three-dimensional geometry, and is analogous to the radian, which quantifies planar angles.
67	**A screw guage represents measurements to an accuracy upto 3 decimals hance the obvious answer is C**
68	Vector is multiplied by a negative number (for example -2, -3 ,-5, -60 unit etc.) or a scalar not only its magnitude is changed but its direction also reversed.

69	Force of friction depends upon literally two factors- 1) The coefficient of friction or the amount of roughness of a surface. 2) On the Normal reaction of the body in upward direction calculated differently as per the given situation. **Now, force of friction = coefficient of friction(mew)*Normal reaction.**
70	Using Formula: **$vy = vyo - gt$**
72	At constant velocity, there is — by definition — no acceleration, so apparent weight is the actual weight. Downward force due to earth's gravity will be $F=mg$, just as when at rest.
73	When you're pushing an object along the floor, the work done by Kinetic Friction is negative. This is because friction acts in the opposite direction of relative motion.
74	Pendulum period on the Moon is longer than the period of the same pendulum on the Earth. The rest, in my opinion, is just not precise enough. ... A pendulum clock designed for the Moon swings once an hour. However, its period is minutes on Earth. Hence for the same time period the length of the pendulum has to be decreased
75	This interference gives rise to a number of important and interesting effects. ... consider two waves with different frequencies traveling in the same direction: So, the sound will seem to pulse with a frequency of 1 Hz. The effect is known as beats.
76	**Supersonic travel is a rate of travel of an object that exceeds the speed of sound (Mach 1).** For objects traveling in dry air of a temperature of 20 °C (68 °F) at sea level, this speed is approximately 344 m/s, 1,125 ft/s, 768 mph, 667 knots, or 1,235 km/h. Speeds greater than five times the speed of sound (Mach 5) are often referred to as hypersonic.
77	When light shines onto a bubble it appears to change colour. Unlike those seen in a rainbow, which arise from differential refraction, the colours seen in a soap bubble arise from **interference of light reflecting off the front and back surfaces of the thin soap film.**
78	Since energy of light coming from the source will be constant, as well as "h" is constant, thus v should be constant. But c and Δ can change such that their ratio is constant. **The energy of light is proportional to its frequency.** **Light does not change energy (frequency) when it moves from one medium to another.**
79	**The Bresser erecting eyepiece** 1.5x is designed for telescopes with a diameter of 31.8mm (1.25 inch). Telescopes and eyepieces turn the image upside down. One uses an erecting eyepiece to turn the image upright, so it can be used to observe terrestrial objects (like birds).
80	**Shortsightedness is corrected using a concave (curved inwards) lens** which is placed in front of a myopic eye, moving the image back to the retina and making it

	clearer. Longsightedness is corrected using a convex (outward facing) lens.
81	**Trimix is a mixture of oxygen, nitrogen and helium and is often used at depth in technical diving and commercial diving** instead of air to reduce nitrogen narcosis and to avoid the dangers of oxygen toxicity. Heliair is a form of trimix that is easily blended from helium and air without using pure oxygen. It always has a 21:79 ratio of oxygen to nitrogen; the balance of the mix is helium.
82	Compressibility actor(Z) may be thought of as the ratio of the actual volume of a real gas to the volume predicted by the ideal gas at the same temperature and pressure as the actual volume. For an ideal gas, Z always has a value of 1.
83	Amorphous solids are called pseudo-solids because they do not exhibit all properties of a solid, as they have tendency to flow(though negligible). This is why they are also called super cooled liquid. Example is glass.
84	Since boiling point is a property depending on the intemolecular forces, hence, boiling point of methane is greater than that of neon because the molecules of methane have stronger intermolecular forces than those of neon.
88	Chemical equilibrium is achieved when the rates of the forward and reverse reaction are equal and the concentrations of the reactants and products remain constant.
89	A solution that shows large negative deviation from **Raoult's law forms a maximum boiling azeotrope at a specific composition.** Negative azeotropes are also called maximum boiling mixtures or pressure minimum azeotropes. An example of a negative azeotrope is hydrochloric acid at a concentration of 20.2% and 79.8% water (by mass).
91	Double the volume at constant pressure means double the absolute temperature from ideal gas equation, **PV= nRT**. This means the temperature required is **2 * 273 = 546** K or 273 deg Celsius.
92	At normal pressures, the volume occupied by the particles is a negligibly small fraction of the total volume of the gas. But at high pressures, this is no longer true. As a result, real gases are not as compressible at high pressures as an ideal gas. The volume of a real gas is therefore larger than expected from the ideal gas equation at high pressures.
93	**Because of high electronegativity of F, there is strong, extensive hydrogen bonding among the HF molecules which makes it quite difficult for release of H as H+ ion in water.**
94	In 1909, Robert Millikan and Harvey Fletcher conducted the oil drop experiment to determine the charge of an electron.
95	**Ionic radii tend to increase in size down a group and decrease across a period. Na+ and K+ belong t group 1A so they have the largest ionic radii out which K+ is placed below Na+ in the group so K+ has the largest ionic radius while Mg2+ belongs to group 2A and Al3+ belongs to group 3A.**
96	An endothermic process is any process which requires or absorbs energy from its surroundings, usually in the form of heat thus, resulting in decrease in temperature of the surrounding air.
97	A mixture of weak base and its salt of strong acid in a water medium is called as a basic buffer. Its pH value is greater than 7.
98	Molarity of any substance is defined as number of moles of that substance present in one liter (volume). Now for water, it can be calculated as follows:Molecular wt of water (MW) = 18 g/mol .Density of water (Density) = 1000 g/L.So if we divide "Density" by "MW", we get 1000 (g/L) /18 (g/mol) = 55.55 (mol/L).That means in

	one liter of water, we have 55.55 mole of water molecules. And that is its Molarity.
99	A zeotropic mixture, or non-azeotropic mixture, is a mixture with components that have different boiling points.[1] For example, nitrogen, methane, ethane, propane, and isobutane constitute a zeotropic mixture. Zeotropic fluid and gaseous mixtures can be separated by distillation due to the difference in boiling points between the component mixtures.
100	Colligative properties of solutions are properties that depend upon the concentration of solute molecules or ions, but not upon the identity of the solute. Colligative properties include vapor pressure lowering, boiling point elevation, freezing point depression, and osmotic pressure.

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AND THE
GOOD LIFE
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Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practice.

Read the following passage and answer the questions given at the end.

Questions 1 – 5:

But man is not destined to vanish. He can be killed, but he cannot be destroyed, because his soul is deathless and his spirit is irrepressible. Therefore, though the situation seems dark in the context of the confrontation between the superpowers, the silver lining is provided by amazing phenomenon that the very nations which have spent incalculable resources and energy for the production of deadly weapons are desperately trying to find out how they might never be used. They threaten each other, intimidate each other and go to the brink, but before the total hour arrives they withdraw from the brink.

Question 1: The main point from the author's view is that

- **A.** Man's soul and spirit cannot be destroyed by superpowers.
- **B.** Man's destiny is not fully clear or visible.
- **C.** Man's soul and spirit are immortal.
- **D.** Man's safety is assured by the delicate balance of power in terms of nuclear weapons.

Question 2: The phrase 'Go to the brink' in the passage means

- **A.** Declare war on each other.
- **B.** Advancing to the stage of war but not engaging in it.
- **C.** Negotiate for peace.
- **D.** Retreating from extreme danger

Question 3: In the author's opinion

- **A.** Huge stockpiles of destructive weapons have so far saved mankind from a catastrophe.
- **B.** Superpowers have at last realized the need for abandoning the production of lethal weapons.
- **C.** Mankind is heading towards complete destruction.
- **D.** Nations in possession of huge stockpiles of lethal weapons are trying hard to avoid actual conflict.

Question 4: 'Irrepressible' in the second line means

- **A.** Strong
- **B.** Incompatible
- **C.** oppressive
- **D.** Unrestrainable

Question 5: A suitable title for the above passage is

- **A.** Destruction of mankind is in evitable.
- **B.** Man's desire to survive inhibits use of deadly weapons.
- **C.** Mounting cost of modern weapons.
- **D.** Threats and intimidation between super powers

Question 6: Parts of seventeenth-century Chinese pleasure gardens were not necessarily intended to look_____they were designed expressly to evoke the agreeable melancholy resulting from a sense of the _____ of natural beauty and human glory.

- **A.** great - immutability
- **B.** joyful - mortality
- **C.** conventional - wildness
- **D.** cheerful – transistorizes

Question 7: The Neolatonists' conception of a deity, in which perfection was measured by abundant fecundity, was contradicted by that of the Aristotelians, in which perfection was displayed in the ____ of creation.

- **A.** variety
- **B.** economy
- **C.** profusion
- **D.** clarity

Question 8: Human reaction to the realm of though is often as strong as that to sensible presences; our higher moral life is based on the fact that _____ sensations actually present may have a weaker influence on our action than do ideas of ___facts.

- **A.** emotional - impersonal
- **B.** familiar : symbolic
- **C.** disturbing - ordinary
- **D.** material – remote

Question 9: Some scientists argue that carbon compounds play such a central role in life on earth because of the possibility of ____ resulting from the carbon atom's ability to form an unending series of different molecules.

- **A.** Variety
- **B.** stability
- **C.** deviations
- **D.** invigorations

Question 10: An occasional ____ remark spoiled the ___ that made the paper memorable.

- **A.** colloquial
- **B.** trite - cliches
- **C.** urbane - sophisticated
- **D.** hackneyed – originality

Write antonyms of the following:
Question 11: RAVEL

- **A.** knit
- **B.** omit
- **C.** remain silent
- **D.** measure

Question 12: PERSISTENCE

- **A.** irrelevance
- **B.** inconstancy
- **C.** inequality
- **D.** intemperance

Question 13: INVIDIOUS:

- **A.** candid
- **B.** Stubborn
- **C.** Inoffensive
- **D.** defensive

Question 14: IGNOMINIOUS:

- **A.** scholarly
- **B.** incognito
- **C.** laudatory
- **D.** disgraceful

Question 15: PALTRY :

- **A.** farm
- **B.** scanty
- **C.** excessive
- **D.** friendly

Choose the correct Analogies.

Question 16: MENDICANT: IMPECUNIOUS

- **A.** hat : askew
- **B.** liar : poor
- **C.** complainer : petulant
- **D.** critic : quizzical

Question 17: BOUQUET: FLOWERS

- **A.** corn : husk
- **B.** woodpile : logs
- **C.** forest : thicket
- **D.** mist : fog

Question 18: NECROMANCY: GHOSTS

- **A.** magic : legerdemain
- **B.** alchemy : gold
- **C.** sorcery : spirits
- **D.** fortune_telling : gypsies

Question 19: EXTROVERT: RETICENT

- **A.** reprobate : humility
- **B.** strategist : decisiveness
- **C.** zealot : loyalty
- **D.** maverick : conformity

Question 20: HYGROMETER: BAROMETER

- **A.** snow : rain
- **B.** humidity : pressure
- **C.** water : mercury
- **D.** temperature : weather

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 21: The inverse function of the function $y = \frac{x-1}{x+1}, x \neq -1\ is$

- **A.** $f^{-1}(y) = \frac{y+1}{y-1}$
- **B.** $f^{-1}(y) = \frac{1-y}{1+y}$
- **C.** $f^{-1}(y) = \frac{1+y}{1-y}$
- **D.** $f^{-1}(y) = \frac{1-y}{y-1}$

Question 22: If radius of a circular disc is unity then its area will be

- **A.** πx^2
- **B.** $2\pi x$
- **C.** π
- **D.** 2π

Question 23: The graph of R1 = $\{(x, y)|x, y \in R$ R and y > x} is

- **A.** Line
- **B.** Points on the line y = x
- **C.** All points below the line y = x
- **D.** All points above the line y = x

Question 24: If f (x) = 2x2 – 1 and g(x) = 5x + 2 then value of f[g(2)] is

- **A.** 312
- **B.** 87
- **C.** 287
- **D.** 288

Question 25: If two medians of a triangle intersect at a point (2, 2) then 3rd median will pass through the point

- **A.** (0, 1)

B. (3, 3)
C. (1, 1)
D. (2, 2).

Question 26: In inclination of a straight line is 45o then its slope is equal to

A. 0
B. 1
C. -1
D. ∞

Question 27: The point of insertion of the lines $3x + 4y = 0$ and $5x - 6y = 0$

A. (3, 4)
B. (5, - 6)
C. (3, 5)
D. (0, 0)

Question 28: The length and breadth of a plane is

A. finite
B. infinite
C. x, y
D. x + y

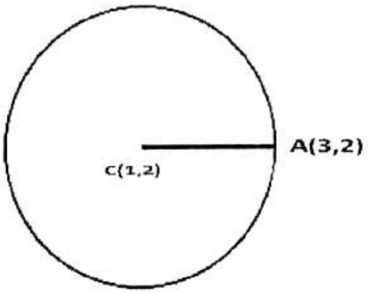
Question 29: The real numbers which satisfy an inequality form its

A. solution
B. coefficient
C. domain
D. range

Question 30: The anti-derivative of $f(y) = e^y\left(cos^{-1}y - \frac{1}{\sqrt{1-y^2}}\right)$ is

A. $e^y \sin^{-1} y + c$
B. $e^y \cos^{-1} y + c$
C. $-e^y \sin^{-1} y + c$
D. $-e^y \cos^{-1} y + c$

Question 31: The equation of the circle given in the figure is



A. $(x + 1)^2 + (y + 2)^2 = 4$
B. $(x - 1)^2 + (y - 2)^2 = 9$
C. $(x - 1)^2 + (y - 2)^2 = 2$
D. $(x - 1)^2 + (y - 2)^2 = 4$

Question 32: The limit of a convergent sequence is ______.

A. Unique
B. Not unique
C. Both A and B
D. None of these

Question 33: If the two lines represented by the equation ax2 + 2hxy + by2 = 0 are perpendicular then,

- **A.** a = b
- **B.** h = ab
- **C.** a + b = 0
- **D.** h = a + b

Question 34: If slope of a line is 2 then slope of the line perpendicular to this line is equal to

- **A.** -2
- **B.** -½
- **C.** 2
- **D.** 0

Question 35: The value of x for which the gradient of y=x2 + 2 becomes equal to 4.

- **A.** 2
- **B.** 4
- **C.** 6
- **D.** 9

Question 36: If the radius of the sphere is increases by 0.2% then the volume increases by about ________.

- **A.** 0.2%
- **B.** 0.6%
- **C.** 0.3%
- **D.** 0.5%

Question 37: The anti derivative of zero is

- **A.** 1
- **B.** 0
- **C.** x
- **D.** constant

Question 38: Locus of points in a plane, the distance of each of which from a fixed point is equal to its distance from a fixed straight line in the plane is called

- **A.** a circle
- **B.** a parabola
- **C.** an ellipse
- **D.** a hyperbola

Question 39: L ∪ M = L∩M then L is equal to

- **A.** M..
- **B.** L
- **C.** φ
- **D.** M′

Question 40: The power set of a set S containing six numbers is the set whose elements are

- **A.** three subsets of S
- **B.** two subsets of S

- **C.** five subsets of S
- **D.** all possible subsets of S

Question 41: The value of in = _______ where n is an odd No.

- **A.** i
- **B.** + i
- **C.** ± i
- **D.** None

Question 42: The two positive numbers which differ by 18 and whose product is 208 are __________.

- **A.** -26,-4
- **B.** 45,5
- **C.** 26, 8 ………….
- **D.** 8,34

Question 43: The value of determinant of the matrix $\begin{matrix} 1 & \cos^2\alpha & \sin^2\alpha \\ 1 & \cos^2\beta & \sin^2\beta \\ 1 & \cos^2\gamma & \sin^2\gamma \end{matrix}$ is

- **A.** 1
- **B.** 0
- **C.** 2
- **D.** -1

Question 44: A non empty set S which is closed with a binary operation '*' is called group if

- **A.** The binary operation is associative
- **B.** There exists identity element with respect to the binary operation.
- **C.** There exist a unique inverse of each element of S with respect to the binary operation.
- **D.** All A, B & C hold.

Question 45: Truth table containing all false values is called

- **A.** Tautology
- **B.** Self-contradiction Equivalent
- **C.** None

Question 46: Which of the following is a geometric series?

- **A.** 5, 7, 9, 11, …..
- **B.** 3, 5, 7, 9…….
- **C.** 1, 1/3, 3, 9, …..
- **D.** 9, 3, 1, 1/3, ……

Question 47: The number of words that can be formed from the letters of the word, "COMMITTEE" are

- **A.** $^9P_9$
- **B.** $^9C_9$

C. $\frac{9!}{2!2!2!}$
D. 9

Question 48: Teams A & B are playing football match. The probability that A will win is 4/13 that of B is 5/13. The probability that the match will end in a draw is

- **A.** 5/13
- **B.** 4/13
- **C.** 9/13
- **D.** 3/13

Question 49: The pth term in the expansion of $(x + y)^{p-1}$ is.

- **A.** $(p-1)y^p$
- **B.** $x.p^{y-1}$
- **C.** py^p
- **D.** y^{p-1}

Question 50: The system of measurement in which the angle is measured in radians is called ______

- A. Circular system
- B. Sexagesimal system
- C. MKS system
- D. CGS system

Section (III):

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice

Physics (Questions 51-80)

Question 51: Chromatic aberration can be removed by combining.

- **A.** A convex lens and concave lens of same type of glass.
- **B.** Two convex lenses or different types of glass
- **C.** Two concave lenses of different types of glass.
- **D.** A concave lens of one type of glass and a convex lens of another types of glass

Question 52: The final image of Astronomical telescope is:

- **A.** Real erect enlarged
- **B.** Virtual erect enlarged
- **C.** Real inverted enlarged
- **D.** Virtual inverted enlarged

Question 53: The phenomenon of interference come out because wave obey:

- **A.** The impulse moment theorem
- **B.** The 1st law of thermodynamics
- **C.** The inverse square law
- **D.** The principle of superposition

Question 54: The one which has the longest wave length in the following is?

- **A.** Red light
- **B.** X - rays
- **C.** Infra – red
- **D.** Radio waves .

Question 55: The human ear is most sensitive sound in the frequency range from..

- **A.** 2 to 4 hertz
- **B.** 20 to 40 hertz
- **C.** 200 to 400 hertz
- **D.** 2000 to 4000/hertz

Question 56: If a body is set to be in resonance with another body its natural frequency must be:

- **A.** half of that of the other body
- **B.** vibrates in greatest amplitude
- **C.** equal to that of the other body
- **D.** Double of that of the other body

Question 57: In order to emit sound a body must.

- **A.** Absorb sound waves
- **B.** Vibrate
- **C.** Reflect sound waves
- **D.** Move towards the hearer

Question 58: The sum of kinetic and potential energies of a falling body

- **A.** Is constant at all points.
- **B.** Is maximum in the begging
- **C.** Is minimum in the beginning
- **D.** Is maximum in the middle of the path

Question 59: The K. E of a 1000 kg car moving at a speed of 80 km/hr will be.

- **A.** $2.47\text{x}10^{8}$ J
- **B.** $2.47\text{x}10^{5}$ J
- **C.** $24.7\text{x}10^{7}$ J
- **D.** $24.7\text{x}10^{3}$ J

Question 60: The center of mass coincides with center of gravity of body, if it is placed:

- **A.** In a non-uniform gravitation field.
- **B.** In a uniform gravitation field
- **C.** At the center of earth
- **D.** At the poles

Question 61: According to the law of universal Gravitation.

- **A.** Every body in the universes attracts everybody.

B. The force of attraction is directly proportional to the product of their masses
C. The force of attraction is inversely proportional to the squire of their distance.
D. All of the above

Question 62: An object is hunched in an arbitrary direction in space with a certain initial velocity and of moves freely under gravity. Its path will be a.

A. Straight line
B. circle
C. parabola
D. hyperbola

Question 63: During the projectile motion, the horizontal component of velocity

A. Change with time
B. Becomes zero
C. Does not change but remains constant.
D. Increases with time

Question 64: A 100 kg body is rotating in circular path of radius 200m, at 50 m/sec. find the centripetal force acting on the body.

A. 225 N
B. 125 N
C. 525 N
D. 500 N

Question 65: If the rate of change momentum with respect to time is zero then.

A. The momentum is a function of time
B. The momentum is not conserved
C. The momentum is constant
D. Some force acts

Question 66: The net force acting on the body of 10 kg moving with uniform velocity of S-1 is:

A. 40 N
B. 4 N
C. 4 N
D. Zero.

Question 67: Scalar product obtains when.

A. A Scalar is multiplied by a scalar.
B. A scalar is multiplied by a vector
C. Two vectors are multiplied to give a scalar
D. Sum of two scalars is taken

Question 68: The first book on analytical "Hisab-ul-jabrwai-Moqab" was written by:

A. Al-Khawarzmi
B. Al-Beruni

C. Al-Razi
D. Ibn-e-sina

Question 69: Absolute zero is equivalent to:

A. 100 °C
B. – 460 ° F
C. 0 °C
D. 273 K

Question 70: Net change in entropy of a system in a natural process:

A. Zero
B. Infinite
C. Positive
D. Negative

Question 71: The molar specific heat of an ideal monatomic gas at constant pressure is:

A. 2R
B. 5/2R
C. R/2
D. 3/2R

Question 72: The magnitude of the force between two unit positive charges when the distance between them is one meter would be:

A. 0 N
B. N
C. N
D. Coulomb's constant

Question 73: The separation between the parallel plates of a capacitor is doubled then its capacitance C will be:

A. 2C
B. ½ C
C. 4C
D. ¼ C

Question 74: A resistor carries a current I. The power dissipated is P. the power dissipated if the same resistor carries the current 3 I is:

A. 9P
B. P/3
C. 3P
D. P

Question 75: A charged particle enters from the left on the plane of paper, perpendicularly on the vertically downward magnetic field. The direction of force on it would be:

A. Perpendicularly on the plane of paper
B. Along the plane of paper

C. Inward on the plane of paper
D. Outward on the plane of paper

Question 76: A magnet is introduced onto the coil and a voltage is induced across the coil. Which of the following factor has no effect on the induced voltage?

A. Thickness of the wire of the coil
B. The strength of the magnetic field
C. The time in which magnet is introduced
D. Number of turns of the coil

Question 77: The process of reducing amplitude of vibration of coil of galvanometer is called

A. Drifting
B. Doping
C. Shunting
D. Damping

Question 78: Whenever a potential is applied across the P-n junction diode so as to increase the height of the Potential barrier, the diode is said to be:

A. Choked
B. Both reverse and forward biased
C. Forward biased
D. Reverse biased

Question 79: If the frequency of light causing photo electric emission is doubled, the kinetic energy of photo electrons will be:

A. The same
B. Zero
C. Doubled
D. Halved

Question 80: Radius of 1st orbit of hydrogen atom is 0.53 oA. Radius of fifth state of Hydrogen atoms is:

A. 2.65 °A
B. 13.25 °A
C. 20 °A
D. Infinite

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Section (IV):

Chemistry (Questions 81-100)

==> THIS SECTION IS ONLY FOR CANDIDATES APPLYING IN MS CHEMISTRY

Question 81: Ethanol is much more soluble in water than ethyl ethanuate which one of the following statement correctly account for this

- **A.** ethanol is polar molecule but ethyl ethanoate is non–polar
- **B.** ethanol is non polar molecule but ethyl ethanoate is polar
- **C.** a hydrogen bond is formed between H–atom of the OH group in ethanol and O–atom of water molecule
- **D.** a hydrogen bond is formed between the H–atom of the OH group in ethanol and hydrogen of the water molecule

Question 82: Boiling point is low for liquid with

- **A.** high vapor pressure at given temperature
- **B.** low vapor pressure at a given temperature
- **C.** very high vapor pressure
- **D.** very low vapor pressure

Question 83: Neutron was discovered by

- **A.** Chadwick
- **B.** Bohr
- **C.** J.J. Thomson
- **D.** Einstein

Question 84: Which of the following involve ionic bonding only?

- **A.** Li_3N
- **B.** NaCl
- **C.** NCl_3
- **D.** O_2

Question 85: One of the causes of reactions is that the systems attains the energy state which is of

- **A.** higher in energy
- **B.** lower in energy
- **C.** balanced in energy
- **D.** equal in energy

Question 86: The C–C bond length in ethene (C2H4) is

- **A.** 154 pm
- **B.** 133 pm
- **C.** 120 pm
- **D.** 105 pm

Question 87: On the basis of VSEPR theory, a molecule with three bond pair and no lone pair of electrons will have a structure

- **A.** linear
- **B.** trigonal planar
- **C.** tetrahedral
- **D.** trigonal pyramidal

Question 88: Enthalpy of neutralisation of all the strong acids and strong bases has the same value because

- **A.** neutralisation leads to the formation of salt and H2O
- **B.** strong acid and bases are ionic substances
- **C.** acids always give rise to H+ ions and bases always furnish OH– ions
- **D.** the net chemical change involve the combination of H+

Question 89: For which reaction the numerical value of Kc and Kp are same

- **A.** N2 + 3H2 2NH3
- **B.** 2SO2 + O2 2SO3
- **C.** H2 + Cl2 2HCl
- **D.** N2O4 2NO2

Question 90: Aqueous solution of glucose boils at 100.52oC. The solution contains

- **A.** 180 gm glucose in 1 litre water
- **B.** 90 gm glucose in 1 litre water
- **C.** 18 gm glucose in 1 litre water
- **D.** 3.6 gm glucose in 1 litre water

Question 91: Metal and their ionic salts both conduct electricity. Which of the following statement is not correct both

- **A.** are good conductors normally
- **B.** are ionic in nature
- **C.** decompose on passing current
- **D.** are normally solid

Question 92: The unit of the rate constant is the same as that of the rate of reaction in

- **A.** first order reaction
- **B.** second order reaction
- **C.** zero order reaction
- **D.** third order reaction

Question 93: In solvent extraction solute can be separated from solution by shaking the solution with solvent which the solute is

- **A.** more soluble
- **B.** partially soluble
- **C.** insoluble
- **D.** soluble at high

Question 94: Chromatography in which the stationary phase is liquid is called

- **A.** partition chromatography
- **B.** descending chromatography
- **C.** column chromatography
- **D.** Adsorption chromatography

Question 95: When 0.01 kg of CaCO3 is decomposed the CO2 produced occupies a volume at S.T.P.

- **A.** 2.2414 dm^3
- **B.** 22.414 dm^3
- **C.** 22414 dm^3
- **D.** 224014 dm^3

Question 96: Largest number of H+ ions are produced by complete ionization of

- **A.** mole of HCl
- **B.** 0.0050 mole of H2SO4
- **C.** 0.000334 moles of H3PO4
- **D.** all above

Question 97: Freezing point depression is measured by

- **A.** Beckmann's apparatus
- **B.** Land's Berger's
- **C.** Antifreeze apparatus
- **D.** all the above

Question 98: the term ebullioscopy is used

- **A.** depression of freezing point
- **B.** elevation in boiling point .
- **C.** lower of vapour pressure
- **D.** none of above

Question 99: Which of following change will favour the formation of more SO3 at equilibrium

$2SO_2 + O_2 2SO_3$ + heat

- **A.** by adding SO_3 at equilibrium
- **B.** by increasing temp
- **C.** by decreasing temp
- **D.** by decreasing pressure

Question 100: A basic Buffer solution can be prepared by mixing

- **A.** weak acid and its salt with strong base
- **B.** strong acid and its salt with weak base
- **C.** weak base and its salt with strong acid
- **D.** strong base and its salt with weak acid

1	A	26	B	51	D	76	A
2	D	27	D	52	D	77	D
3	A	28	B	53	D	78	D
4	B	29	A	54	D	79	C
5	A	30	B	55	D	80	B
6	D	31	D	56	C	81	C
7	B	32	A	57	D	82	C
8	D	33	C	58	A	83	A
9	A	34	B	59	B	84	A
10	D	35	A	60	B	85	C
11	A	36	B	61	D	86	B
12	B	37	D	62	C	87	B
13	C	38	B	63	C	88	D
14	B	39	A	64	B	89	C
15	A	40	D	65	C	90	A
16	C	41	D	66	D	91	B
17	B	42	C	67	C	92	C
18	C	43	D	68	A	93	A
19	D	44	B	69	B	94	A
20	B	45	D	70	C	95	B
21	C	46	D	71	B	96	D
22	C	47	C	72	D	97	A
23	D	48	B	73	B	98	B
24	C	49	D	74	A	99	C
25	D	50	A	75	A	100	A

21	First, replace f(x) with y This is done to make the rest of the process easier. **Replace every x with a y and replace every y with an x**
22	The area enclosed by a circle of radius r is πr^2. Here the Greek letter π represents a constant, approximately equal to 3.14159, which is equal to the ratio of the circumference of any circle to its diameter.
23	**The Set builder form denotes that the numbers are rational and stands as y is greater than x** on a graph hence it is the line y = x where all the points lie above this line
24	Substitute **the function g in to function f and the put the x=2 to find the answer, Simple Composite Function**
25	All **medians of the triangle intersect at the same point.**
26	**The slope of angle of inclination is found from TanQ hence the value is 1**
27	Using Formula: $x = \frac{b1c2-b2c1}{a1b2-a2b1}; y = \frac{a2c1-a1c2}{a1b2-a2b1}$
28	A geometric line is formed by connecting two points along the shortest possible path. It has infinite length and no thickness. We usually work with line segments, or pieces of lines. **A geometric plane is a perfectly flat surface that has infinite length and width, but no thickness.**
29	Solutions satisfy any equation or inequality

30	Integrate by finding the anti-derivative of the argument of the integral.
31	Using the General Circle Equation: $(x - h)^2 + (y - k)^2 = r^2$
32	Suppose to the contrary that L≠ML≠M. Let ϵ=|L−M|10. There is an N1N1 such that if n>N1n>N1 then |an−L|<ϵ|an−L|<ϵ. There is an N2N2 such that if n>N2n>N2 then |an−M|<ϵ|an−M|<ϵ. Let N=max(N1,N2)N=max(N1,N2). If n>Nn>N then |an−L|<ϵ|an−L|<ϵ and |an−M|<ϵ|an−M|<ϵ. But then by the Triangle inequality |L−M|≤|an−L|+|M−an|<210|L−M||L−M|≤|an−L|+|M−an|<210|L−M|. This is impossible. Hence the assumption L≠ML≠M is false and L=ML=M.
33	If a + b = 0 the value of tanQ is∞ and hence Q is 90°. Hence two straight lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ are perpendicular to each other if coefficient of x2 + coefficient of y2 = 0.
34	A line perpendicular to another has a slope that is the negative reciprocal of the slope of the other line.
35	The gradient of the line = (change in y-coordinate)/(change in x-coordinate)
36	Using Formula: $V = \frac{4}{3} * \pi r^3$
37	The integral of 0 is C, because the derivative of C is zero.
38	The parabola is defined as the locus of a point which moves so that it is always the same distance from a fixed point (called the focus) and a given line (called the directrix).
39	The only situation where LuM and LnM can be equal is the L=M
40	Number of all the subsets of a given set is called the power of a set.
41	The odd power of Iota given iota as a result
42	Simple Observation
43	Convert row two and three to tan by multiplying and dividing by respective function and Use If elements of any two row or column of a determinant are equal then the value of the determinant is equal to zero.
44	Identity element. In mathematics, an identity element or neutral element is a special type of element of a set with respect to a binary operation on that set, which leaves other elements unchanged when combined with them.
46	Since each of the members in the series are being divided by 3
47	Simple rules of permutation and combination
48	The total number of outcomes are 13, if A has 4 chances of winning and B has 5, the chances left for draw are 4
49	Since this will be the last term of the expansion it will be independent of x.
50	Unit of measurement of angles - a radian (the circular measure) The relation between a central angle a (the angle between two radii) and the corresponding arc l in the circle of radius r is shown by the proportion, a° : 360° = l : 2rp.
51	A concave lens of one type of glass and a convex lens of another types of glass
52	Astronomical telescope in which the image is inverted, is one of the two principal types of the telescopes. Its primary function is to enlarge the retinal image of a distant object. Then the eyepiece forms a virtual inverted image of this intermediate object at infinity.
53	The principle of superposition may be applied to waves whenever two (or more) waves travelling through the same medium at the same time. The waves pass through each

	other without being disturbed.
54	**Radio waves has the longest wavelength and shortest frequency.**
55	**While 20 to 20,000Hz forms the absolute borders of the human hearing range, our hearing is most sensitive in the 2000 - 5000 Hz frequency range. As far as loudness is concerned, humans can typically hear starting at 0 dB.**
56	**Resonance is a phenomenan of forced oscillations.** In forced oscillations, there's an external force on the system which changes with some frequency while the system has its own frequency. When they both become equal, we see resonance.
57	**The motion of materials or objects causes vibrations. A sound originates in the vibration of an object,** which makes the air or another substance around the object vibrate. The vibration of the air moves outward in all directions in the form of a wave.5 The following are examples of how certain sounds are produced.
58	**The sum of an object's potential and kinetic energies is called the object's mechanical energy.** As an object falls its potential energy decreases, while its kinetic energy increases. The decrease in potential energy is exactly equal to the increase in kinetic energy.
59	Using Formula: $\boldsymbol{K.E} = ½\,\boldsymbol{mv^2}$
60	In a uniform gravitational field the centre of gravity is identical to the centre of mass, a term preferred by physicists. **The location of a body's centre of gravity may coincide with the geometric centre of the body, especially in a symmetrically shaped object composed of homogeneous material.**
61	Newton's law of universal gravitation states that every particle attracts every other particle in the universe with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers.
63	The horizaontal velocity of a projectile always remains constant. The vertical velocity changes due the effect of gravity
64	Using Formula: $\boldsymbol{\frac{mv^2}{r}}$
65	**Momentum of an isolated object (or system of objects) is conserved.** If the net force acting on an object is zero, then the linear momentum is constant. In an elastic collision (such as a super ball hitting and rebounding from the ground), no kinetic energy is lost.
66	**Since the velocity is negative hence the acceleration is decreasing which means that no force is being applied to pull the object hence the net force is zero'**
67	**The scalar product of two vectors A and B is a scalar quantity equal to the product of the magnitudes of the two vectors and the cosine of the smallest angle between them. The scalar product is commutative, A×B = B×A.** When we form the scalar product of two vectors, we multiply the parallel component of the two vectors.
69	**Degrees Celsius (°C) and kelvins (K) have the same magnitude. The only difference between the scales is their starting points: 0 K is "absolute zero," while 0°C is the freezing point of water. One can convert degrees Celsius to kelvins by adding 273.15; thus, the boiling point of water, 100°C**
70	If a reversible process occurs, there is no net change in entropy. In an irreversible process, entropy always increases, so the change in entropy is positive
71	**For ideal monatomic gases: the molar heat capacity at constant pressure (Cp) is 5/2 R = 20.8 J K−1 mol−1 (4.97 cal K−1 mol−1);**

72	**The symbol k is a proportionality constant known as the Coulomb's law constant.** The value of this constant is dependent upon the medium that the charged objects are immersed in. In the case of air, the value is approximately 9.0 x 109 N.
73	The capacitance of a parallel plate capacitor is directly proportional to the area of the plate and inversely proportional to the distance between the plates, the capacitance would decrease if the distance between the plates were to be increased.
74	Using Formula $P = I \times V$
76	Michael Faraday did experiments that showed that induced e.m.f for a coil of wire depends on four things: Magnetic strength of the core in the coil of wire. **(stronger --> bigger emf)** Number of turns of wire in the coil **(more turns --> bigger emf)** The cross-sectional area of the coil **(bigger area --> bigger emf).** (This could also be seen as the angle you point the magnet at the coil, because flux linkage is basically the same as flux cutting.) How fast you move the magnet into/out of the coil. **(Faster --> bigger emf)**
77	**Galvanometer damping. A ballistic galvanometer will oscillate if it has not been properly damped.** The flux density in a magnetic field can be measured using a small flat coil of fine insulated wire with a large number of turns called a search coil or snatch coil.
78	**When the polarity of the battery is such that electrons are allowed to flow through the diode, the diode is said to be forward-biased. Conversely, when the battery is "backward" and the diode blocks current, the diode is said to be reverse-biased.**
79	Initially, $K1=hf-\phi$ When we double the frequency from f to 2f, $K2=h(2f)-\phi$ or, $K2=2(hf-\phi)+\phi$
80	Using Formula: $Rn = \frac{\varepsilon 0 n^{2h^2}}{\pi m e^2}$
81	**Ethanol has a polar –OH group, which hydrogen bonds to water; which makes ethanol soluble.** Since both water and alcohols have an OH they can hydrogen bond with each other, this makes them miscible. Miscible meaning mixing completely to form a homogeneous solution.
82	**The normal boiling point is the temperature in which the vapour pressure of a liquid becomes equal to atmospheric pressure. If the intermolecular forces are small, the liquid has a high vapour pressure.** Little heat energy will have to be added to separate the molecules, so the boiling point will be low. So, the boiling point decreases as the vapour pressure increases.
83	**The essential nature of the atomic nucleus was established with the discovery of the neutron by James Chadwick in 1932 and the determination that it was a new elementary particle, distinct from the proton.**
84	An ionic compound is a chemical compound in which ions are held together in a lattice

	structure by ionic bonds which always exist between a metal and a nn metal .Lithium is a metal, and nitrogen is a non-metal so Li3N is lithium nitride consists of ionic bond.
85	The reason for reaction to occur is to achieve the equilibrium state in which the rate of the **forward process equals the rate of the reverse process and balance in energy is achieved**.
86	**In ethene (C2H4),C-C bond length is 133 pm and C-H bond length is 108 pm.**
87	The Valence Shell Electron Pair Repulsion (VSEPR) theory is a simple and useful way to predict and rationalize the shapes of molecules. The theory is based on the idea of minimizing the electrostatic repulsion between electron pairs. **According to VSEPR, a molecule with three bond pair and no lone pair of electrons will have a trigonal planar structure, with bond angle of 120°. Example is BF3**
88	The enthalpy of neutralization for all strong acid-strong base reactions should be the same within experimental error because all those reactions are in simple terms, **H+ + OH- = H2O.** Although the enthalpy of neutralization for all strong acid-strong base reactions are within experimental error, that is not the case of weak acid-strong base reactions. This is not the case because weak acids do not completely dissociate into ions like strong acids do. **Therefore the enthalpy of weak acid-strong base reactions is less than the enthalpy of strong acid-strong base reactions.**
89	Using Formula: Kc = (Concentration of product)/(Concentration of reactant), Kp = (partial pressure of product)/(partial pressure of reactant)
90	The formula for glucose is **C6H12O6 so the molecular mass of glucose is 180mg so Aqueous solution of glucose contains 180 gm glucose in 1 litre water.**
91	It is not necessary for the metals to be ionic in Nature
92	**If the reaction is zero order, the rate constant is same as the rate of reaction therefore rate constant has exactly the same units as the rate of the reaction mol L-1 s -1**
93	Since the more soluble solute will dissolve in the solvent and will not require the energy to be increased to dissolve
94	The principle of partition chromatography is that the separation of components of given sample occurs due to partition of components between two liquid phases. In this process, the stationary phase is coated with a liquid surface. The solid surface must be immiscible in the mobile phase.
96	**An ebullioscope (from the Latin ēbullīre (to boil) + -scope) is an instrument for measuring the boiling point of a liquid.** This can be used for determining the alcoholic strength of a mixture, or for determining the molecular weight of a non-volatile solute based on the boiling-point elevation.
97	**Beckmann thermometer is used to measure small temperature changes in the freezing point of pure solvent and solution.** Beckmann thermometer is not used in determining the absolute value of freezing temperature of the solvent or that of the solution. It is therefore called a differential thermometer.
98	An ebullioscope (from the Latin ēbullīre (to boil) + -scope) is an instrument for measuring the boiling point of a liquid. Boiling-point elevation describes the

Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practice.

Read the following passage and answer the questions given at the end.

QUESTION 1-5:

Born on Jan 12, 1863 in an affluent Bengali family, Narendra Natha Datta was a precocious child who was what we call nowadays, an all-rounder, excelling in music, studies and athletics. His father Vishwanatha Datta was a well-known attorney. However, he took the spiritual route instead and introduced Hinduism to the world in 1893 when he spoke at the World's Parliament of Religion (probably one of the most epic things any Indian has done abroad!).

The historic speech was given on September 11, 1893 by Swami Vivekananda. Here's the full text of his opening and closing address:

Sisters and Brothers of America,

It fills my heart with joy unspeakable to rise in response to the warm and cordial welcome which you have given us. I thank you in the name of the most ancient order of monks in the world; I thank you in the name of the mother of religions, and I thank you in the name of millions and millions of Hindu people of all classes and sects.

My thanks, also, to some of the speakers on this platform who, referring to the delegates from the Orient, have told you that these men from far-off nations may well claim the honor of bearing to different lands the idea of toleration. I am proud to belong to a religion which has taught the world both tolerance and universal acceptance.

We believe not only in universal toleration, but we accept all religions as true. I am proud to belong to a nation which has sheltered the persecuted and the refugees of all religions and all nations of the earth. I am proud to tell you that we have gathered in our bosom the purest remnant of the Israelites, who came to Southern India and took refuge with us in the very year in which their holy temple was shattered to pieces by Roman tyranny. I am proud to belong to the religion which has sheltered and is still fostering the remnant of the grand Zoroastrian nation. I will quote to you, brethren, a few lines from a hymn which I remember to have repeated from my earliest boyhood, which is every day repeated by millions of human beings: "As the different streams having their sources in different paths which men take through different tendencies, various though they appear, crooked or straight, all lead to Thee."

The present convention, which is one of the most august assemblies ever held, is in itself a vindication, a declaration to the world of the wonderful doctrine preached in the Gita: "Whosoever comes to me, through whatsoever form, I reach him; all men are struggling through paths which in the end lead to me." Sectarianism, bigotry, and its horrible descendant, fanaticism, have long possessed this beautiful earth.

Question 1. What was Vishwanatha Datta's profession?

a. Attorney
b. Spiritual leader
c. Teacher

d. None of the above

Question 2. Who spoke at the World's Parliament of Religion?

a. Narendra Nath Datta
b. Swami Vivekananda
c. Both
d. None

Question 3. Give the opposite of the word "Occident" from the second passage of the speech

a. Delegate
b. Universal
c. Orient
d. Toleration

Question 4. In the phrase: "all lead to Thee", to whom does the word 'Thee' refer?

a. All religions
b. The delegates present
c. Universal brotherhood and peace
d. God

Question 5. In the phrase: "I am proud to belong to a nation" What nation is the speaker referring to?

a. India
b. Southern India
c. Rome
d. America

Question 6: President Anwar el - Sadat of Egypt, disregarding ______ criticism in the Alab world and in his own Government, ______ accepted prime minister Menahem Begin's invitation to visit Israel in order to address the Israeli parliament.

A.acrimonious – formally
B.blemished - stiffly
C.categorical - previously
D.malignant – plaintively

Question 7: In his usual _____ manner, he had insured himself against this type of loss.

A.pensive
B.providential
C.indifferent
D.circumspect

Question 8: Melodramas, which presented stark oppositions between innocence and criminality, virtue and corruption, good and evil, were popular precisely because they offered the audience a world___ of ____

A. deprived - polarity
B. full - circumstantiality

- C. bereft - theatricality
- D. devoid – neutrality

Question 9: Having fully embraced the belief that government by persuasion is preferable to government by ____ the leaders of the movement have recently ___ most of their previous statements supporting totalitarianism.

- A. proclamation - codified
- B. coercion – repudiated
- C. participation - moderated
- D. intimidation - issued

Question 10: Without the psychiatrist's promise of confidentiality, trust is _____ and the patient's communication limited; even though confidentiality can thus be seen to be precious in therapy, moral responsibility sometimes requires willingness to ____ it.

- A. lost - forget
- B. implicit - extend
- C. impaired – sacrifice
- D. ambiguous - apply

Write antonyms of the following:

Question 11: ABOMINATE:

- **A.** loathe
- **B.** despise
- **C.** adore
- **D.** abhor

Question 12: RECANT:

- **A.** entangle
- **B.** rescue
- **C.** fail
- **D.** assert

Question 13: DISTEND

- A. deteriorate
- B. weaken
- C. constrict
- D. Concentrate

Question 14: OUTLANDISH

- A. Conventional
- B. prolific
- C. unchanging
- D. transparent

Question 15: ACUITY

A: quality
B. certainty
C. plenitude
D. stability

Choose the correct Analogies.

Question 16: CONFIRMED: INVETERATE

A.knowledge : supposed
B.financial : bankrupt
C.immature : callow
D.credible : incredible

Question 17: DORY: VAN

A.dairy : cow
B.fish : vehicle
C.freighter : caisson
D. runners : wheels

Question 18: PARENTHESIS: EXPLANATION

A. ellipsis : omission
B. asterisk : exaggeration
C. synopsis : affectation
D. apostrophe : annotation

Question 19: SAND PAPER: ABRASIVE

A. gasoline : refined
B. grativity : irritant
C. polish : floors
D. oil : lubricant

Question 20: RIG: CONTEST

A. solve : conundrum
B. predict : race
C. repudiate : thesis
D. gerrymander : district

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your pract

Question 21. If x,yιR, then x+ιy is purely imaginary if

- **A.** $x=0,\ y\neq0$
- **B.** $x\neq0,\ y=0$
- **C.** $x=0, y\neq0$
- **D.** $x\neq0,\ y\neq0$

Question 22. A-B is a subset of …………………… If $B\subseteq A$

- **A.** 0
- **B.** B
- **C.** $A\cup B$
- **D.** $A\cap B$

Question 23. If $x=\sqrt{2+\sqrt{2+\sqrt{2+}}\ \ldots\ldots\ldots\ldots}$ a, then x=……………?

- **A.** 0
- **B.** 1
- **C.** 2
- **D.** None of these

Question 24. The value of $\begin{vmatrix}1 & a & b+c\\ 1 & b & c+a\\ 1 & c & a+b\end{vmatrix}$

- **A.** a+b+c
- **B.** 0
- **C.** 1
- **D.** ab+bc+ca

Question 25. $y=3x+15$ the slope of the line represented by the equation is

- **A.** 3
- **B.** 5
- **C.** 9
- **D.** 6

Question 26: If cos θ=-1, then ……….,…………., neZ

- **A.** $\theta\neq(2n+1)\pi$
- **B.** $\theta=(2n+1)\pi$
- **C.** $\theta=\frac{n\pi}{2}$
- **D.** None of these

Question 27: $\frac{\cos 11°+\sin 11°}{\cos 11°-\sin 11°}$=?

- **A.** $\tan 56^0$
- **B.** $\sin 56^0$
- **C.** $\cos 56^0$
- **D.** None

Question 28: Due to periodicity, the trigonometric equations have ………… number of solutions

- **A.** Finite
- **B.** Infinite
- **C.** Two
- **D.** None of these

Question 29: The projection of -2i+3j+7k on 2j+k is

- **A.** 13/5
- **B.** 13/4
- **C.** $13/\sqrt{5}$
- **D.** 13

Question 30: $2x + 3<0$ is

- **A.** Inequality
- **B.** Equality
- **C.** Identity
- **D.** None

Question 31. If two sets have no common element then they are called ____________

- **A.** Overlapping sets
- **B.** Disjoint sets
- **C.** Complementary sets
- **D.** Equivalent sets

Question 32. $\begin{bmatrix} 9 & 0 \\ 0 & 9 \end{bmatrix}$ is a ___________matrix,

- **A.** Scalar
- **B.** Diagonal
- **C.** Null
- **D.** Identity

Question 33. If roots of the equation ax2+b=0 are real and unequal the;

- **A.** ab>0
- **B.** ab<0
- **C.** a=0
- **D.** ab=0

Question 34. A square matrix is called ___________ matrix if all the elements below the principle diagonal are 0;

- **A.** Upper triangular
- **B.** Symmetric
- **C.** Skew hermit ion
- **D.** Diagonal

Question 35. The conditional equation $\frac{1}{x}$=x holds if x=

- **A.** 1/3
- **B.** 1/2
- **C.** 1/4
- **D.** 1

Question 36: If R1 = $\{(x, y)|x, y \in R$ and $x > y\}$ is a binary relation then its inverse is

- A. $\{(1, 2), (2, 3)\}$
- B. $\{(2, 1), (3, 2), (4, 3)\}$
- C. $\{(x, y)| x = y\}$
- D. $\{(x, y)| x, y \in R$ and $y > x\}$

Question 37: Non negative constraints are called ________ variables.

- A. non – decision
- B. decision
- C. constant
- D. none of the above

Question 38: The points (x, y) which satisfy a linear inequality in two variables x and y form its

- A. Domain
- B. Range
- C. Solution
- D. None of these

Question 39: (0, 1) is in the solution of inequality

- A. $x - 2y > 0$
- B. $x - y < 2$
- C. $3x + 2y > 5$
- D. $3x - 2y < 2$

Question 40: The equation of straight line through (-5, -4) having slope 7

- **A.** $7x + 21=y$
- **B.** $y=7x+31$
- **C.** $y+4=x+5$
- **D.** $y-7x=-31$

Question 41: Which of the following points lie on circle $\frac{(x-4)^2}{25}\frac{(y-3)^2}{25}=1$

- **A.** (0, 0)
- **B.** (0, 6)
- **C.** (9, 3)
- **D.** All

Question 42: In case of $\sqrt{4 - x^2}$ the suitable substitution is x=

- **A.** $2\sin\theta$
- **B.** $2\cos\theta$
- **C.** $2\tan\theta$

D. $2 \sec \theta$

Question 43: The point of intersection of $2x-3y=8$ and $3x+2y=-1$ is

A. $(1, -2)$

B. $(2, 3)$

C. $(-1, 3)$

D. None

Question 44: Which term of the A.P 5, 2, -1,………………. is -85?

A. 29th term

B. 31th term

C. 32th term

D. 30th term

Question 45: If $f(x) = \sin x$, the slope of the function is?

A. 0

B. 1

C. -1

D. ∞

Question 46: $(1+x)^{-1}$ is valid when

A. $X>1$

B. $X<1$

C. $X=0$

D. $X\neq0$

Question 47: If A and B are disjoint sets, then $P(A\cup B)$=?

A. $P(A)+P(B)$

B. $P(A)-P(B)$

C. $P(A\cap B)$

D. $P(A)+P(B)\_P(A\cap B)$

Question 48: $\frac{\sin 2\alpha}{1+\cos 2\alpha}$=?

A. $\cot \alpha$

B. $-\cot \alpha$

C. $-\tan \alpha$

D. $\tan \alpha$

Question 49: If A, G and H are the A.M, G.M and H.M b/w two numbers then A,G,H are in

A. A.P

B. H.P

C. G.P

D. None of these

Question 50: Equation of the line through A(-6, 5) having slope 7 is

A. $7x-y+47=0$

B. $7x+y-47=0$

C. $7x+y+47=0$

D. $X+7y+47=0$

Section (III):

Physics (Questions 51-80)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 51: Caloric is the:

- **A.** Hypothetical weightless fluid
- **B.** Imaginary concept of energy
- **C.** Energy
- **D.** Molecular motion

Question 52: Molecules of which gas, Oxygen or Nitrogen in air will move fast at some particular temperature:

- **A.** Molecules of both gases will move with same Velocities
- **B.** Oxygen
- **C.** Nitrogen
- **D.** None of these

Question 53: Two equal masses of an ideal gas at same temperature and pressure are compressed to half of their volumes, one of them isothermally and the other adiabatically. Which one of the following would be same for both?

- **A.** The internal energy of-the compressed gases
- **B.** Heat given out during compression
- **C.** Temperature of the compressed gases
- **D.** None of these

Question 54: Increase in length per unit length per degree rise in temperature of aluminium rod of 10m is 24 x 10- 6 /C. What would be the increase in volume per unit volume per degree rise in temperature of a cube of aluminium of volume 100m3 when both are heated through the same range of temperature?

- **A.** 72 x 10^{-6}/C
- **B.** (b) 7.2 x 10^{-3}/ °C
- **C.** (c) 24 x 10^{-6}/C
- **D.** (d) 2.4 x 10^{-3}/ °C

Question 55. Megawatt day is the unit of,

- A. Power
- B. Energy
- C. Force
- D. Speed

Question 56. KWH is the unit of

- A. Energy
- B. Power
- C. Force

D. Emf

Question 57. Two bodies A and B have velocity ratio 1:2. The ratio of the K.E is

A. 4:1
B. 1:4
C. 2:1
D. 1:2

Question 58: Which quantity of audio signal is changed by transistor:

A. All of these
B. Amplitude
C. Frequency
D. Wave length

Question 59: If two bodies of equal mass collide elastically then

A. their velocities are added to each other
B. their velocities are subtracted
C. their velocities do not changed
D. they exchange their velocities

Question 60: During free fall, of air friction is negligible then acceleration of bodies of different masses is:

A. The same for all the masses
B. Different for different masses
C. Different for different vertical positions.
D. Both A & B

Question 61: The value of 'g' at the Centre of earth is:

A. Maximum
B. Minimum
C. Zero
D. None of them

Question 62: Ball pen functions on the principle of

A. Viscosity
B. Boyle's law
C. Gravitational force
D. Surface tension

Question 63: If the temp. Rises, the coefficient of viscosity of a liquid?

A. Decreases
B. Increases
C. Remains same
D. Increases for some liquid and decreases for others

Question 64. Which of the following has the longest wavelength

A. Blue light
B. Gamma rays
C. X-rays

D. Red light

Question 65: Diffraction effect is

- **A.** More for round edge
- **B.** Less for round edge
- **C.** More for sharp edge
- **D.** Less for sharp edge

Question 66: Wavelength of x-rays falling at glance angle 30^0 on a crystal with atomic spacing $2*10^0$ m for the 1^r order diffraction is

- **A.** $4*10^8$m
- **B.** $2*10^{10}$m
- **C.** $0.2*10^{10}$m
- **D.** $20*10^{10}$m

Question 67: Due to change of magnetization some heat is produced in the coils of transformer when alternating current is supplied at its input. This process is called:

- A. Rectification
- B. Drifting
- C. Induction
- D. Hysteresis

Question 68: A magnet is introduced onto the coil and a voltage is induced across the coil. Which of the following factor has no effect on the induced voltage?

- A. Thickness of the wire of the coil
- B. The strength of the magnetic field
- C. The time in which magnet is introduced
- D. Number of turns of the coil

Question 69: The couple per unit twist of the suspension is equal to

- A. Sum of deflection and restoring torque
- B. Product of deflection and restoring torque
- C. Deflection per restoring torque
- D. Restoring torque per deflection

Question 70: Maximum change in wave length of X-rays photon could be obtained when X-rays are scattered at:

- A. Right angle
- B. 180°
- C. 45°
- D. 0°

Question 71: What is the average translation K.E of molecules in gas at temperature 27°C

- **A.** $6.2\text{x}10^{-12}$ m s^{-1}
- **B.** $1.28\text{x}10^{-10}$ m s^{-1}
- **C.** $2.34\text{x}10^{-12}$ m s^{-1}

D. None

Question 72: The maximum percentage efficiency of engine operating between 227°C and 7°C is

A. 56%
B. 44%
C. 60%
D. 40%

Question 73: Energy acquired by a charged particle of 2e moving through a potential difference of 5 V is

A. 7ev
B. $1.6\text{x}10^{-18}$J
C. 10J
D. None

Question 74: If the color code on a carbon resistor from left to right are white, violet and red then the resistance will be

A. 9700ohm
B. 970ohm
C. 97 ohm
D. None

Question 75: A proton is assumed to be made of _______ quarks.

A. Two up & one down
B. One up & two down
C. Three down
D. None

Question 76: When effective value of current is 10. What is its peak value?

A. 12
B. 13
C. 10
D. 14.2

Question 77: If the no. of turns of an inductor in increased two times then its inductance will be:

A. Doubled
B. Four times
C. Half
D. 1/four

Question 78: If the intensity of the radiation is doubled then the photo emission will be:

A. Double
B. Four times
C. Half
D. Eight times

tĖaM kNoWlEdGe

Question 79: The time interval during which the voltage source changes its polarity once is known as:

- **A.** Period of the alternating current
- **B.** Period of the alternating current
- **C.** Frequency of the alternating current
- **D.** Frequency of the resistance

Question 80: The potential through which an electron should be accelerated so that on collision it can lift the electron in the atom from its ground state to some higher state is known as:

- **A.** Stopping Potential
- **B.** Breaking Potential
- **C.** Ground Potential
- **D.** Excitation Potential

Section (IV):

Chemistry (Questions 81-100)

==> THIS SECTION IS ONLY FOR CANDIDATES APPLYING IN MS CHEMISTRY

Question 81: What is empirical formula for glucose?

- **A.** CH_2O
- **B.** CH
- **C.** $C_{16}H_{12}O_6$
- **D.** CHO

Question 82: Which of the following statements is correct?

- **A.** 1.008g of H has $6.02X10^{23}$ atoms
- **B.** 2.016g of H_2 has $2X6.02X10^{23}$ atoms
- **C.** 1.008g of H_2 has $6.02X10^{23}$ atoms
- **D.** Both options A and B are correct

Question 83: Base principle of crystallization is:

- **A.** Solute should be completely soluble in solvent at room temperature and excess amount is thrown out as crystals
- **B.** Solute should be soluble in a suitable amount of solvent at high temperature and excess amount of solute is is thrown out as crystals when is cooled
- **C.** Solute should not be soluble in a suitable amount of solvent at any temperature so that solute is is thrown out at any temperature
- **D.** Solute should not be affected by temperature for its solubility in order to form crystal

Question 84: The bubbling up of gas from soda drink is best explained by:

- **A.** Gas diffuses from the liquid into the surroundings
- **B.** Gas diffuses from the surroundings into the liquid
- **C.** The low density of gas as compared to the liquid cause the gas to bubble up
- **D.** Decreased pressure of the surroundings cause the gas to come out from high pressure liquid.

Question 85: The effect of pressure on density of gas is explained as under:

A. Increase in pressure causes decrease in density
B. Gas diffuses from the surroundings into the liquid
C. The low density of gas as compared to the liquid cause the gas to bubble up
D. Decreased pressure of the surroundings cause the gas to come out from high pressure liquid.

Question 86: The C–C bond length in ethene ($C2H4$) is

A. 154 pm
B. 133 pm
C. 120 pm
D. 105 pm

Question 87: On the basis of VSEPR theory, a molecule with three bond pair and no lone pair of electrons will have a structure

A. linear
B. trigonal planar
C. tetrahedral
D. trigonal pyramidal

Question 88: Enthalpy of neutralisation of all the strong acids and strong bases has the same value because

A. neutralisation leads to the formation of salt and H2O
B. strong acid and bases are ionic substances
C. acids always give rise to H+ ions and bases always furnish OH– ions
D. the net chemical change involve the combination of H+

Question 89: Feldspar potash mica and zircon are the famous minerals of

A. Oxygen
B. Phosphorus
C. Carbon
D. Silicon

Question 90: Both carbon and silicon Covalent bonds

A. Form
B. Do Not Form
C. Never Form
D. None of these

Question 91: Kekule proposed a cyclic regular structure for benzene

A. Triangular
B. Rectangular
C. Hexagonal
D. None of these

Question 92: Formally borax was manufactured by treating a hot solution of boric acid with the proper amount of

A. Calcium
B. Potassium
C. Soda Ash
D. Sodium

Question 93: In microwave oven, the wave energy produced is absorbed by certain polar molecule. In which molecule out of the given molecule would absorb maximum energy?

A. SiO2
B. C2H5OH
C. NaCl
D. None of these

Question 94: Which of the following statement regarding cathode rays is correct?

A. Cathode rays can ionize gas
B. Cathode rays can possess momentum
C. Cathode rays cannot cause chemical changes
D. All of these

Question 95: Ionization energy does not increase?

A. With small atomic radius of atoms.
B. It increases in no of electronic shells
C. By increase in portion no of atom
D. None of these

Question 96: Which of the molecule does not exibit TETRAHEDRAL arrangement of electron pair?

A. H2O
B. SiCl2
C. NH3
D. None of these

Question 97: The change in enthalpy of reaction NaOH+HCl→ NaCl+H2O is?

A. Heat of reaction
B. Heat of fusion
C. Heat of neutralization
D. Heat of combustion

Question 98: Which of them is most reactive one

A. Alkane
B. Alkene
C. Alkyne
D. Benzene

Question 99: Which electrophile is used in the nitration of benzene?

A. HNO_3
B. NO_3
C. NO_2
D. NO_2

Question 100: Which compound has maximum repulsion with water?

A. C_2H_2

B. $CH_2CH_2CH\,OH$

C. C_2H_3OH

D. CH_3OCH_3

1	**B**	21	**A**	41	**D**	61	**C**	81	**A**
2	**B**	22	**D**	42	**B**	62	**D**	82	**A**
3	**C**	23	**C**	43	**D**	63	**B**	83	**B**
4	**D**	24	**B**	44	**A**	64	**D**	84	**D**
5	**B**	25	**A**	45	**B**	65	**C**	85	**B**
6	**A**	26	**B**	46	**D**	66	**B**	86 -	**B**
7	**D**	27	**A**	47	**A**	67	**C**	87	**B**
8	**D**	28	**A**	48	**D**	68	**A**	88	**D**
9	**B**	29	**A**	49	**A**	69	**D**	89	**D**
10	**C**	30	**A**	50	**A**	70	**B**	90	**D**
11	**C**	31	**B**	51	**D**	71	**D**	91	**C**
12	**D**	32	**B**	52	**C**	72	**B**	92	**C**
13	**C**	33	**A**	53	**A**	73	**B**	93	**B**
14	**A**	34	**D**	54	**A**	74	**B**	94	**D**
15	**C**	35	**B**	55	**B**	75	**A**	95	**A**
16	**B**	36	**D**	56	**A**	76	**D**	96	**B**
17	**C**	37	**A**	57	**B**	77	**F**	97	**C**
18	**A**	38	**C**	58	**B**	78	**E**	98	**C**
19	**D**	39	**B**	59	**D**	79	**A**	99	**A**
20	**D**	40	**D**	60	**A**	80	**D**	100	**D**

21	**Since complex numbers are points which also represent y axis as an imaginary part hence y axis can not be zero for an imaginary number**
22	In mathematics, a set A is a subset of a set B, or equivalently B is a superset of A, if A is **.When quantified, A ⊆ B is represented as: ∀x{x∈A → x∈B}. Here since B is a Subset of A, A-B will be a subset of AuB**
24	Can be solved easily by using the Rules of determinant of a matrix which make the whole determinant equal to 1 by making any two rows or colums equal. The Rules are: 1. Interchange two rows or cols changes the sign: -> -1 * det(A) 2.transpose -> det (A) unchanged. 3.multiply row * k -> k * det(A) 4. multiply matrix * k -> k^2 * det(A)5. det (A B) -> det(A) * det(B) 6. proportional rows or columns -> det() == 0 7. Add multiple of one row to another -> det unchanged. 8.Geometric interpretation. are the rule for solving the determinants.
25	Since the line given is in slope intercept form $y = mx + c$ the value of m in the

	equation is your slope
26	By taking $\boldsymbol{Cos^{-1}}$ the answer is Pi
27	And the answer is tan56 degree found out using double angel formula for tan, tan $\boldsymbol{(a+b) = \frac{(tana + tanB)}{1-tana*tanb}}$
28	A solution of a trigonometric equation is the value of the unknown angle that satisfies equation. if a trigonometric equation has a solution, it will have Infinitely Number Of Solutions. Thus, **a solution generalize by means of periodicity is known as the general solution.**
29	Using projection formula: $proj_{\vec{a}}\vec{b} = \frac{\vec{a}\cdot\vec{b}}{\lvert\vec{a}\rvert}\frac{\vec{a}}{\lvert\vec{a}\rvert} = \frac{\vec{a}\cdot\vec{b}}{\lvert\vec{a}\rvert^{2}}\vec{a}$
30	Many simple inequalities can be solved by adding, subtracting, multiplying or dividing both sides until you are left with the variable on its own. **But these things will change direction of the inequality: Multiplying or dividing both sides by a negative number. Swapping left and right hand sides.**
31	Two sets are disjoint if they have no elements in common, i.e., if their intersection is the empty set.
32	**A scalar matrix is a special kind of diagonal matrix. It is a diagonal matrix with equal-valued elements along the diagonal.**
33	For the roots of the equation to be real and unequal the product of the roots is greater than Zero
34	A square matrix is **upper (resp. lower) triangular if all its non-zero off diagonal** elements are above and to **the right (resp. below and to the left) of the diagonal** — i.e., **in the upper (resp. lower) triangle bounded by the principal diagonal.**
35	Just fill in the value of the options in the given and only one will satisfy the equation
36	The answer is required to be the **inverse relation of what is given which is x > y hence the inverse is y > x**
37	**Non-Negativity Constraints**. The linear inequalities x>=0 and y>=0. These are included because x and y are usually the number of items produced and you cannot produce a negative number of items, the smallest number of items you could produce is zero.
38	Solution Satisfies equations and inequalities.
39	Putting the given points in the given inequalities to find out the answer
40	Convert the given equation in the $\boldsymbol{Y = mx + c}$ for and fill In the given value of x, y and m (slope), the answer will represent the correct option, option number C is incorrect since it is not in slope intercept form.
41	The simplest way to solve It to fill in the given values of x and y from the options into the given equation, the option which satisfies the equation is your answer
42	Apply differentiation to the given
43	Solve both equations simultaneously

44	Using formula: $Tn = a + (n - 1)d$
45	Can be done by taking d/dx of the given function
46	Because if x is equal to zero then the function will have one 1 left to which any power irrespective of the sign will give the value 1
47	Since the sets are disjoint PA + PB is the only way then can become equal to P(AuB)
48	Using double angle formulas for Sin2a = $2sinacosa \; and \; cos2a = cos^2a - sin^2a$
49	**A.P>G.M>H.M**
50	The equations are in the format of $Y = mx + c$ m is the slope which is given and the rest are the value for x and y, fill in the values and only one equation will satisfy the answer
51	**The caloric theory is an obsolete scientific theory** that heat consists of a self-repellent fluid called caloric that flows from hotter bodies to colder bodies. Caloric was also thought of as a weightless gas that could pass in and out of pores in solids and liquids.
52	**Nitrogen and oxygen exist as diatomic molecules naturally.** If you calculate the molar mass of both gases, oxygen has a molar of 32g/mol and nitrogen has a molar mass of 28g/mol. The lighter the gas the faster it moves. Nitrogen is lighter than oxygen. Thus, it moves faster.
53	**Internal energy changes in an ideal gas may be described solely by changes in its kinetic energy. Kinetic energy is simply the internal energy of the perfect gas and depends entirely on its pressure, volume and thermodynamic temperature.** Also An ideal gas by definition has no interactions between particles, no intermolecular forces, so pressure change at constant temperature does not change internal energy. Real gases have intermolecular interactions, attractions between molecules at low pressure and repulsion at high pressure. Their internal energy changes with change in pressure, even if temperature is constant. For an ideal gas, in an isothermal process, **$\Delta U=0=Q-W$, so $Q=W$.**
54	Using Formula: $dV = V0 * \beta * (t1 - t0)$, where β is the volumetric temperature expansion coefficient which for aluminium is 69x10^-6
55	Megawatt-day (unit: MWd). Megawatt-day is a derived unit of energy. It is used to measure energy produced, especially in power engineering.
56	**The kilowatt hour (symbol kWh, kW·h or kW h) is a unit of energy equal to 3.6 megajoules.**
57	Using formula $K.E = ½ M * V^2$
58	Transistors acts as amplifiers. Amplifiers produce gain while filters alter the amplitude and/or phase characteristics of an electrical signal with respect to its frequency. As these amplifiers and filters use resistors, inductors, or capacitor networks (RLC) within their design, there is an important relationship between the use of these reactive

	components and the circuits frequency response characteristics.
59	**In One Dimensional Elastic Collision Bodies of Equal Masses Exchange their Velocities.** It means after the collision final velocity of the second body is the initial velocity of the first body and the final velocity of first body is the initial velocity of the second body.
60	Because since there is no resistance the bodies will be acted upon by the gravity only causing the acceleration to be 9.8m/s^2
61	The only gravity strong enough for us to feel comes from the Earth's mass, which is why we feel a downward pull on the surface. At the center of the Earth, the situation is different. **Because Earth is nearly spherical, the gravitational forces from all the surrounding mass counteract one another.**
62	Ball pen functions on the **principle of surface tension**. Pen is fitted with a tiny ball bearing in its tip. As the pen moves along the paper, the ball rotates picking up ink from the ink cartridge and leaving it on the paper.
63	With high temperatures, **viscosity increases in gases and decreases in liquids, the drag force will do the same.**
64	Optical rays have more wavelength than any of the options and among the optical rays Red has the longest Wave length
65	In electromagnetic wave propagation, the knife-edge effect or edge diffraction is a redirection by diffraction of a portion of the incident radiation that strikes a well-defined obstacle such as a mountain range or the edge of a building.
66	**Wave length = 2 d SinQ**
67	With regard to magnetic fields, a magnetic field is generated when a current flows through a wire. This current can be D.C. too - the phenomena is not limited to A.C. current. The direction of the magnetic field depends upon the direction of current flow.
68	Factors affecting the induced current: Magnetic strength of the core in the coil of wire. Number of turns of wire in the coil **(more turns --> bigger emf)** The cross-sectional area of the coil **(bigger area --> bigger emf).**
69	Torsional rigidity is also known as the twisting couple per unit twist. As the name suggests it is the amount of twisting couple or torque required to twist the object by one unit angle, i.e., one radian in other words restoration of torque per deflection
71	$E = \frac{3KT}{2}$
72	$\%E = 1 - \frac{T2}{T1}$
73	**V = W/q**
74	White = 9, Violet = 7, red = 2
75	In an atomic nucleus, a proton is made up of two up quarks and one down quark, and a neutron is composed of one up quark and two down quarks.

76	$$IRMS = \frac{Peak}{1.414}$$
77	In henrys, is $L = \frac{(N^2) * u * A}{l}$ so if you double the number N of turns, you increase the inductance four times (2^2)
78	The overall power of the source of light (intensity) is doubled. Each photon has double the energy as before.
79	**The interval of time between the attainment of an identical value on two successive cycles is called a period or wave cycle.** In other words, one period is the amount of time the electrons take to flow from the negative end (-) of the source to the positive end (+) of the source, reverses its direction (negative polarity -) and flow to the positive end (+) of the source.
80	The term is most generally used in connection with electron excitation, but it can be applied to excited molecular vibrational and rotational states. A closely related term is excitation energy.
81	In chemistry, the empirical formula of a chemical compound is the simplest positive integer ratio of atoms present in a compound. A simple example of this concept is that the empirical formula of sulphur monoxide, or SO, would simply be SO, as is the empirical formula of disulfur dioxide, S_2O_2.
82	Since the given mass of Hydrogen is equal to 1 mole and 1 mole of the substance has 6.023 x 10^23 particles
83	**The principle behind the crystallisation is that the amount of solute that can be dissolved by a solvent increases with temperature.** In crystallisation, the impure substance is dissolved in a suitable solvent to reach its nearly saturated solution at a temperature higher than the room temperature.
84	The space above the soft drink is filled with carbon dioxide at more than twice the atmospheric pressure. **The hissing sound results from the escape of the gas into air. When a bottle is opened the pressure inside decreases. Bubbles appear as the carbon dioxide dissolved in the liquid turns into gas.**
85	Pressure affects the density of gazes the most. ... At a given temperature and at atmospheric pressure, solids and liquids will have a specific volume. By increasing the pressure on the material, you can often slightly decrease its volume and thus increase its density.
86	In ethene **(C2H4),C-C bond length is 133 pm and C-H bond length is 108 pm.**
87	The Valence Shell Electron Pair Repulsion (VSEPR) theory is a simple and useful way to predict and rationalize the shapes of molecules. The theory is based on the idea of minimizing the electrostatic repulsion between electron pairs. According to VSEPR, a molecule with three bond pair and no lone pair of electrons will have a trigonal planar structure, with bond angle of 120°. Example is BF3
88	The enthalpy of neutralization for all strong acid-strong base reactions should be the same within experimental error because all those reactions are in simple terms, **H+ +**

	$OH^- = H_2O$. Although the enthalpy of neutralization for all strong acid-strong base reactions are within experimental error, that is not the case of weak acid-strong base reactions. This is not the case because weak acids do not completely dissociate into ions like strong acids do. Therefore the enthalpy of weak acid-strong base reactions is less than the enthalpy of strong acid-strong base reactions.
89	The vast majority of the minerals that make up the rocks of Earth's crust are silicate minerals. These include minerals such as quartz, feldspar, mica, amphibole, pyroxene, olivine, and a great variety of clay minerals. The building block of all of these minerals is the silica tetrahedron, a combination of four oxygen atoms and one silicon atom
90	Carbon forms covalent bond but silicon does not
91	Kekulé was the first to suggest a sensible structure for benzene. The carbons are arranged in a hexagon, and he suggested alternating double and single bonds between them. Each carbon atom has a hydrogen attached to it.
92	From boric acid : Borax is prepared from boric acid by boiling with soda ash. On cooling the solution, borax separates out. **$4H_3BO_3 + Na_2CO_3 \longrightarrow Na_2B_4O_7 + 6H_2O + CO_2 \uparrow$**
93	Neither NaCl nor SiO_2 is polar. NaCl is an ionic substance and SiO_2 is nonpolar. C_2H_5OH is very polar.
94	Cathode rays are originating from cathode as cathode is negatively charged. These rays then hit the gas sample inside the tube and ionize it. the fact that they have a mass and as a result they definitely momentum and kinetic energy. They can cause a chemical change, because they have reducing effect.
95	Moving left to right within a period or upward within a group, **the first ionization energy generally increases. As the atomic radius decreases, it becomes harder to remove an electron that is closer to a more positively charged nucleus.** ... They experience a weaker attraction to the positive charge of the nucleus.
96	In case of SCl_2 the central atom sulfur has four electron pair around the it but again 2 are bonded pair and two non bonding so it will not exhibit the **perfect tetrahedral geometry,**
97	The enthalpy of neutralization (ΔHn) is the change in enthalpy that occurs when one equivalent of an acid and one equivalent of a base undergo a neutralization reaction to form water and a salt. It is a special case of the enthalpy of reaction. It is defined as the energy released with the formation of 1 mole of water.
98	Alkynes have two pi-bonds between two (or more) carbon atoms, along with a sp-sp hybridised orbital bonding (sigma bond). The pi-bonds can be easily broken to free the valence shell electrons for combining with other atoms. Hence they are themost reactive.
99	The first step in the nitration of benzene is to activate $HNO_3$with sulfuric acid to produce a stronger electrophile, the nitronium ion.
100	**Dimethyl ether is an ether hence has maximum repulsion**

Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practic

Read the following passage and answer the questions given at the end.

Today I Rabindranath Tagore complete eighty years of my life .As I look back on the vast stretch of years that lie behind me and see in clear perspective the history of my early development, I am struck by the change that has taken place both in my own attitude and in the psychology of my countrymen -- a change that carries within it a cause of profound tragedy.

Our direct contact with the larger world of men was linked up with the contemporary history of the English people whom we came to know in those earlier days. It was mainly through their mighty literature that we formed our ideas with regard to these newcomers to our Indian shores. In those days the type of learning that was served out to us was neither plentiful nor diverse, nor was the spirit of scientific enquiry very much in evidence. Thus their scope being strictly limited, the educated of those days had recourse to English language and literature. Their days and nights were eloquent with the stately declamations of Burke, with Macaulay's long-rolling sentences; discussions centered upon Shakespeare's drama and Byron's poetry and above all upon the large-hearted liberalism of the nineteenth-century English politics.

At the time though tentative attempts were being made to gain our national independence, at heart we had not lost faith in the generosity of the English race. This belief was so firmly rooted in the sentiments of our leaders as to lead them to hope that the victor would of his own grace pave the path of freedom for the vanquished. This belief was based upon the fact that England at the time provided a shelter to all those who had to flee from persecution in their own country. Political martyrs who had suffered for the honour of their people were accorded unreserved welcome at the hands of the English.

I was impressed by this evidence of liberal humanity in the character of the English and thus I was led to set them on the pedestal of my highest respect. This generosity in their national character had not yet been vitiated by imperialist pride. About this time, as a boy in England, I had the opportunity of listening to the speeches of John Bright, both in and outside Parliament. The large-hearted, radical liberalism of those speeches, overflowing all narrow national bounds, had made so deep an impression on my mind that something of it lingers even today, even in these days of graceless disillusionment.

Question 1. From the first paragraph, give a synonym for 'deep':

a. Perspective
[✓ b. Profound]
c. Tragedy
d. Psychology

Question 2. What helped the Indians to conceive of a notion of the Englishmen?

a. Their advanced weaponry
[✓ b. Their literature]
c. Their orders
d. Their administration

Question 3. Who could read and gain from English literature?

[✓ a.] The educated Indians
b. All the Indians
c. Only writers such as Rabindranath Tagore
d. None of the above

Question 4. From the third paragraph, give an antonym for 'victorious'

a. Victor
b. vanquished
c. Belief
[✓ d.] Persecution

Question 5. Whose speeches did Tagore listen to, as a boy?

a. Shakespeare
b. Byron
c. John Bright
[✓ d.] Macaulay

Question 6. In eighth-century Japan, people who _______ wasteland were rewarded with official ranks as part of an effort to overcome the shortage of ____ fields.

a. cultivated - domestic
b. located - desirable
c. conserved - forested
[✓ d.] reclaimed – arable

Question 7. Melodramas, which presented stark oppositions between innocence and criminality, virtue and corruption, good and evil, were popular precisely because they offered the audience a world___ of ____

a. deprived - polarity
b. full - circumstantiality
c. bereft - theatricality
[✓ d.] devoid – neutrality

Question 8. Clearly refuting sceptics, researchers have _____ not only that gravitational radiation exists but that it also does exactly what the theory___ it should do.

a. assumed - deducted
[✓ b.] demonstrated – predicted
c. supposed - asserted
d. doubted – warranted

Question 9. Ecology, like economics, concerns itself with the movement of valuable ____ through a complex network of producers and consumers.

a. nutrients
b. dividends
[✓ c.] communications
d. artifacts

Question 10. In his usual _____ manner, he had insured himself against this type of loss.

a. pensive
b. providential
c. indifferent

[✓ d.] circumspect

Write antonyms of the following:

Question 11. ABOMINATE:

a. loathe
b. despise
[✓ c.] adore
d. abhor

Question 12. RECANT:

a. entangle
b. rescue
c. fail
[✓ d.] assert

Question 13. DISTEND

a. deteriorate
b. weaken
[✓ c.] constrict
d. Concentrate

Question 14. OUTLANDISH

[✓ a.] Conventional
b. prolific
c. unchanging
d. transparent

Question 15. FERVID

a. undistinguished
b. unexpected
c. stubborn
[✓ d.] restrained

Choose the correct Analogies.

Question 16. LULLABY : BARCAROLE

a. birth : marriage
b. night : morning
[✓ c.] cradle : gondola
d. song : poem

Question 17. LURK : WAIT

a. boost : elevate
b. deplete : drain
[✓ c.] abscond : depart
d. bilk : cheat

Question 18. NECROMANCY: GHOSTS

a. magic : legerdemain
b. alchemy : gold
[✓ c.] sorcery : spirits
d. fortune_telling : gypsies

Question 19. EXTROVERT: RETICENT

a. reprobate : humility
b. strategist : decisiveness
c. zealot : loyalty
[✓ d. maverick : conformity]

Question 20. HYGROMETER: BAROMETER

a. snow : rain
[✓ b. humidity : pressure]
c. water : mercury
d. temperature : weather

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 21. If n is a negative number, then √n is

(a) a rational number
(b)an irrational number
(c) only negative integer
[✓ (d) a pure Imaginary]

Question 22. The number '0' is

(a) a-non positive integer
(b) a non negative integer
(c) real number
[✓ (d) all of these]

Question 23. For the matrix A=[aij] nxn ,the elements a1n, a2n-1, a3n-2……an are

(a) Main
(b) Leading diagonal
(c) principal diagonal
[✓ (d) Secondary diagonal]

Question 24. For the square matrix A= [aij].. If all aij = 0, i ≠ j and at least one aij≠0, i=j then A is called

[✓ (b) Diagonal matrix]
(b) Scalar matrix
(c) Identity matrix
(d) Null matrix

Question 25. x-a is a factor of x^n-a^n, where n is

[✓ a. Any integer]
b. Any positive integer
c. Any odd number
d. Any real number

Question 26. Product of roots of any quadratic equation is

a. $\frac{coefficient\ of\ x^2}{coefficient\ of\ x}$
b. $\frac{coefficient\ of\ x}{coefficient\ of\ x^2}$
c. $-\frac{coefficient\ of\ x}{coefficient\ of\ x^2}$
[✓ d. $\frac{constant\ term}{coefficient\ of\ x^2}$]

Question 27. The partial fraction of $\frac{x^2-10x+13}{(x-1)(x^2-5x+6)}$ are of the form

[✓ a.] $\frac{A}{x-1}+\frac{Bx+C}{x-3}+\frac{Dx+E}{x-2}$

b. $\frac{A}{x-1}+\frac{B}{x-3}+\frac{C}{x-2}$

c. $\frac{Ax+B}{x-1}+\frac{C}{x^2-5x+6}$

d. Non of these

Question 28. The number of partial fraction of $\frac{x^3}{x(x+1)(x^2 \_ 1)}$ are

a. 2

b. 3

[✓ c.] 4

d. None

Question 29. If $\{a_n\}$ is an Arithmetic sequence then common difference is:

a. $a_{n+1} - a_{n-1}$

[✓ b.] $a_{n+1} - a_n$

c. $a_n - a_{n+1}$

d. $a_{n-1} - a_{n+1}$

Question 30. The general term of an A.P. is:

[✓ a.] $a_n = a + (n-1)d$

b. $a_n = a - (n-1)d$

c. $a_n = a + (n+1)d$

d. $a_n = a - (n+1)d$

Question 31. 8.7.6.is equal to

[✓ a.] P(8,3)

b. C(8,3)

c. P(8,5)

d. C(8,5)

Question 32. Different signals of 5 flags of different colors, using 3 at a time is

[✓ (a)] 60 (b)5 (c) 120 (d)10

Question 33. $\binom{2n}{0}+\binom{2n}{1}+\binom{2n}{2}+\cdots+\binom{2n}{2n}$ is equal to

[✓ a.] 2^n

b. 2^{2n}

c. 2^{2n-1}

d. 2^{2n+1}

Question 34. If n is odd then middle term/s is $(a+x)^n$ is/are

a. $\left(\frac{n+1}{2}\right) th\ term$
b. $\left(\frac{n}{2}+1\right) th\ term$
[✓ c.] $\left(\frac{n+1}{2}\right) th\ and\ \left(\frac{n+3}{2}\right) th\ term$
d. $\left(\frac{n}{2}+1\right) th\ and\ \left(\frac{n}{2}+2\right) th\ term$

Question 35. If $\theta=45^0$, $r=18$mm then l is equal to
[✓ a.] $9/2\pi$
b. $2/9\pi$
c. 810
d. 810mm

Question 36. Area of sector of circle of radius r is
[✓ a.] $1/2r^2\theta$
b. $1/2r\theta^2$
c. $½(r\theta)^2$
d. $1/2r^2\theta$

Question 37. $sin12^0 sin46^0$ is equal to

a. $\frac{1}{2}(cos34^0 - cos58^0)$
[✓ b.] $\frac{1}{2}(cos58^0 - cos34^0)$
c. $(cos58^0 - cos34^0)$
d. $\frac{1}{2}(cos58^0 + cos34^0)$

Question 38. Which is the allied angle?

[✓ a.] $90^0+\theta$
b. $60^0+\theta$
c. $45^0+\theta$
d. $30^0+\theta$

Question 39. Period of 2cosec$\frac{x}{4}$
a. 2π
b. 4π
c. 8π
[✓ d.] $\frac{\pi}{2}$

Question 40. Period of 3tan$\frac{x}{7}$ is

a. $\frac{7\pi}{3}$

[✓ b.] 7π

c. $\frac{14\pi}{3}$

d. 14π

Question 41. In any triangle ABC, if $\beta = 90^0$, then $b^2 = c^2 + a^2 - 2ac\,cos\beta$ becomes

a. Law of sines

b. Law of tangents

[✓ c.] Pythagoras theorem

d. None of these

Question 42. In any triangle ABC, $\sqrt{\frac{(s-b)(s-c)}{bc}} =$

[✓ a.] $\sin\frac{\alpha}{2}$

b. $\cos\frac{\alpha}{2}$

c. $\sin\frac{\beta}{2}$

d. $\sin\frac{\gamma}{2}$

Question 43. Tan $(\sin^{-1}(-1/2))$=……

a. $\sqrt{3}$ c. $\frac{1}{\sqrt{3}}$

b. $-\sqrt{3}$ [✓ d.] $-\frac{1}{\sqrt{3}}$

Question 44. $\sin^{-1} A + \sin^{-1} B$ is equal to

[✓ a.] $\text{Sin}^{-1}(A\sqrt{1-B^2}+B\sqrt{1-A^2})$

b. $\text{Sin}^{-1}(A\sqrt{1-B^2}-B\sqrt{1-A^2})$

c. $\text{Sin}^{-1}(B\sqrt{1-A^2}-A\sqrt{1-B^2})$

d. $\text{Sin}^{-1}(AB\sqrt{(1-A^2)(1-B^2)})$

Question 45. General solution of $tanx = 1$ is:

[✓ a.] $\left\{\frac{\pi}{4} + n\pi,\ \frac{5\pi}{4} + n\pi\right\}$

b. $\left\{\frac{\pi}{4} + 2n\pi,\ \frac{5\pi}{4} + 2n\pi\right\}$

c. $\left\{\frac{\pi}{4} + n\pi,\ \frac{3\pi}{4} + n\pi\right\}$

d. $\left\{\frac{\pi}{4} + 2n\pi,\ \frac{3\pi}{4} + 2n\pi\right\}, n\epsilon Z$

Question 46. If $tan2x = -1$, then solution in the interval $[0, \pi]$ is:

- [✓ a.] $\frac{\pi}{8}$
- b. $\frac{\pi}{4}$
- c. $\frac{3\pi}{8}$
- d. $\frac{3\pi}{4}$

Question 47. $\lim_{x \to a} \frac{x^3 - a^3}{x - a}$=?

- [✓ a.] Undefined
- b. $3a^2$
- c. a^2
- d. 0

Question 48. $\lim_{x \to 0}(1 + x)^{1/x}$=?

- a. 1/e
- [✓ b.] E
- c. e^2
- d. undefined

Question 49. If $y = e^{2x}$ then y_2 =?

- a. e^{2x}
- b. $2e^{2x}$
- [✓ c.] $4e^{2x}$
- d. $16e^{2x}$

Question 50. $\frac{d}{dx}(ax + b)^n$=?

- a. $n(a^{n-1}x + b)$
- b. $n(ax + b)^{n-1}$
- c. $n(a^{n-1}x)$
- [✓ d.] $na(ax + b)^{n-1}$

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Section (III):Physics (Questions 51-80)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 51. If the wavelength of green line of the visible spectrum is 546 nm, what is its value in meters?

a) 54.6×10^{9} m
[✓ b) 54.6×10^{-8} m]
c) 546×10^{-19} m
d) $546\times10-10$ m

Question 52. "100 radians" are equal to how much degrees?

(a) 57.3°
[✓ b) 5732°]
c) 573°
d) 5.73°

Question 53. The direction of vector product is given by:

(a) Head to tail rule
[✓ b) right hand rule]
c) Left hand rule
d) triangle rule

Question 54. If both components of a vector are negative, then resultant lies in

a) 1st quadrant
b) 2nd quadrant
[✓ c) 3rd quadrant]
d) 4th quadrant

Question 55. The horizontal range of a projectile is the same for the angles

a) 60° and 80°
b) 40° and 70°
c) 45° and 55°
[✓ d) 40° and 50°]

Question 56. Laws of motion are valid in those systems which:

a) Are non-inertial
[✓ b) are inertial]
c) are at rest
d) are in space

Question 57. The mechanical advantage of any machine is:

a) The efficiency of the machine the work done by the machine
b) The ratio of the work done by the machine to the work expended on it
c) The ratio of the force exerted by the machine to the force applied to it
[✓ **d)** The ratio of the force applied to the machine to the force exerted by it]

Question 58. A 2-kg object is moving at 3m/s. A 4-N force is applied in the direction of motion and then removed after the object has travelled an additional 5m.

The work done by this force is:

a) 12J
b) 15J
c) 18J
[✓ d) 20J]

Question 59. Moment of inertia is measured in:

[✓ a) $kgm2$]
b) $kgm-2$
c) Ns
d) rad/s

Question 60. The angular momentum is given by:

a) mω
b) ω × F
c) r × F
[✓ d) r × p]

Question 61. The equation $F = 6\pi\eta rv$ is called:

a) Newton's law
[✓ b) Stoke's law]
c) Ohm's law
d) Lenz's law

Question 62. Stokes law is applicable if body has __________ shape:

a) Rough
b) Square
c) Circular
[✓ d) Spherical]

Question 63. The displacement of SHM is written as X = Xo sinωt, If displacement is written by: X = Xo cosωt then phase constant will be equal to:

a) 0°
b) 45°
[✓ c) 90°]
d) 180°

Question 64. Phase of SHM describes:

a) Displacement only

b) Direction of motion only

[✓ c) Both displacement and direction of motion]

d) Neither displacement nor direction of motion

Question 65. Increase in velocity of sound in air for $1°C$ rise in temperature is:

[✓ a) $0.61\ ms^{-1}$] b) $61\ ms^{-1}$ c) $1.61\ m^{-1}s$ d) $2ms^{-1}$

Question 66. The speed of sound is greater in solids than in gases due to high value of:

a) Density b) Pressure [✓ c) Elasticity] d) Temperature

Question 67. Phase difference of 180° is equivalent to a path difference of:

a) λ [✓ b) $\lambda/2$] c) $\lambda/4$ d) $\lambda/8$

Question 68. A light ray traveling form denser to rarer medium suffers a phase change of:

[✓ a) 0°] b) 90° c) 180° d) 45°

Question 69. One angstrom is equal to:

a) $10^{-9}m$ b) $10^{-8}m$ [✓ c) $10^{-10}m$] d) $10^{-11}m$

Question 70. $2d \sin\theta = m\lambda$ is called:

a) Laplace's equation b) Reflection equation

c) Refraction equation [✓ d) Bragg's equation]

Question 71. The magnifying power of a compound microscope is given by:

a) $pq1 + fed$ [✓ b) $qp1 + dfe$] c) $1 + fed$ d) $pq1 + dfe$

Question 72. The magnifying power of an astronomical telescope is:

a) $f0 + fe$ b) $f0 - fe$ c) $f0fe$ [✓ d) $f0fe$]

Question 73. For normal adjustment, the length of astronomical telescope is:

[✓ a) $f0 + fe$] b) $f0 - fe$ c) $f0fe$ d) $f0fe$

Question 74. For the phenomenon of total internal reflection, the angle of incidence should be:

a) Equal to critical angle b) Smaller than critical angle

[✓ c) Greater than critical angle] d) Zero

Question 75. Which one is correct relation?

a) $CP + CV = \gamma$ b) $CP = 1 + R/CV$

[✓ c) $\gamma = CP/CV$] d) $CP = 1 - R/CV$

Question 76. Specific heats of a gas at constant pressure and at constant volume are respectively Cp and Cv:

a) Cp <Cv [✓ b) Cp >Cv] c) Cp = Cv d) none of these

Question 77. Numerical value of Boltzmann's constant is:

a) $1.38 \times 10-31JK-1$ b) $3.18 \times 10-31JK-1$

c) $3.18 \times 10-23JK-1$ [✓ d) $1.38 \times 10-23JK-1$]

Question 78. Bending of light around the edges of an obstacle is known as

a) Refraction b) Polarization [✓ c) Diffraction] d) Interference

Question 79. The bending of beam of light when it pass from one medium to another is known as:

[✓ a) Refraction] b) Reflection c) Diffraction d) Dispersion

Question 80. If radius of droplet becomes half then its terminal velocity will be:

a) Half   b) Double   [✓ c) One forth]   d) Four times

Section (IV): Chemistry (Questions 81-100)

==> THIS SECTION IS ONLY FOR CANDIDATES APPLYING IN MS CHEMISTRY

Question 81. When arranged in the increase of atomic mass, the properties are the periodic function of their atomic mass is called as the Law of:

[✓ a. Mendeleev`s periodic Law]
b. Modern periodic Law
c. Lother Mayer's Law
d. None of these.

Question 82. Which of the following pairs are chemically dissimilar?

a. Na and K
b. Ba and Sr
c. Zr and Hf
[✓ d. Ca and Zn]

Question 83. What are the numbers of periods in the original periodic table of Mendeleev?

[✓ a. 12]
b. 8
c. 9
d. 18

Question 84. The composition of Bleaching Powder for simplicity is expressed as

[✓ a. $CaOCl_2$]
b. KNO_2
c. KNO_3
d. None of them

Question 85. The flame test color of strontium is

a. Purple
b. Pink
c. range
[✓ d. Red]

Question 86. A dehydrating agent commonly used in the laboratory is

[✓ a. KNO_3]
b. CaF_3
[✓ c. $CaCl_2$]
d. None of them

Question 87. Which of the following alkaline earth metal salts does not impart any colour to the Bunsen flame?

[✓ a. Magnesium nitrate]
b. Calcium chloride
c. Barium chloride
d. Strontium chloride

Question 88. The structure of H_2SO_4 is

[✓ a) Trigonal] b)Hexagonal c)Octahedral d)Tetrahedral

Question 89. Dinitrogentetraoxide has a very weak

a) S-S bond [✓ b)N-N bond] c)Both a and b d)None of them

Question 90. Orthophosphoric acid is a

[✓ a) Tribasic acid] b)Base c)Monobasic acid d)Di basic acid

Question 91. Which of the following sets gives the correct arrangement of the compounds involved based on their bond strengths?

[✓ a) HF>HCl>HBR>HI] b)HF > HCl > HI > HBR

c)HF > HI > HCl > HBR d)HCl > HF > HI > HBR

Question 92. Which of the following is antiseptic?

[✓ a) I] b)Br c)Cl d)F

Question 93. The shape of the molecule SF3Cl3 is

a) Trigonalbipyramidal b)Cubic [✓ c)Octahedral] d)Square pyramidal

Question 94. Which is an example of a bidentate ligand?

a. H2O
b. Cl(-ve)
[✓ c. H2NCH2CH2NH2]
d. OH(-)

Question 95. The correct electronic configuration of Cr is

a. [Ar]4s23d4
b. [Ar]4s2d4
c. [Ar] 4s03d5
[✓ d. [Ar]4s13d5]

Question 96. Which among these is the simplest example for polycyclic arenes?

a. Benzacephenanthrylene c. Pyrene
[✓ b. Naphthalene] d. Dibenz-anthracene

Question 97. Arenes are polar. State true or false

a. True
[✓ b. False]

Question 98. Which of the following is not the method of preparation of alkyl halide?

(a) Darzen's method (c) Both a and b
[✓ (b) Hydration of alkene] (d) Neither a nor b

Question 99. Which of the following reactant gives the best method of preparation of alkyl halides when reacts with alcohol?

[✓ (a) $SOCl_2$/ Pyridine]
(b) Zn/HCl
(c) Both a and b
(d) Neither a nor b

Question 100. Which one of the following is also known as tartaric acid?

[✓ (a)] 2,3-dihydroxy butanedioic acid
(b) 3,3-dihydroxy butanedioic acid
(c) 5,3-dihydroxy butanedioic acid
(d) 2,4-dihydroxy butanedioic acid

1)	**B**
2)	**B**
3)	**A**
4)	**D**
5)	**D**
6)	**D**
7)	**D**
8)	**B**
9)	**C**
10)	**D**
11)	**C**
12)	**D**
13)	**C**
14)	**A**
15)	**D**
16)	**C**
17)	**C**
18)	**C**
19)	**D**
20)	**B**
21)	**Option D. A pure imaginary number** **Explanation:** √-n does not belong to real numbers. Therefore, for convenience we call it Imaginary number and denotes it with i

	$\sqrt{(-n)}=\sqrt{n}\,\sqrt{(-1)}=\sqrt{n}\,i$
22)	**Option D. All of these**
23)	**Option (d) Secondary diagonal** **Explanation:** Let A = $[a_{ij}]$ be a square matrix o f order n, then the entries $a_{11}, a_{22}, a_{33}, \ldots, a_{nn}$ form the principal diagonal for the matrix A and the entries a1n , a2 n-1, a3 n-2, ..., an-1 2 , an1 form the secondary diagonal for the matrix A. For example, $\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$ in this matrix the entries a_{13} , a_{22}, a_{31} form the secondary diagonal
24)	**Option (a) Diagonal matrix** **Explanation:** By definition of diagonal matrix : Let A = [aij] be a square matrix of order n. If aij = 0 for all i ≠ j and at least one aij ≠ 0 for i = j, that is, some elements of the principal diagonal of A may be zero but not all, then the matrix A is called a diagonal matrix. The matrices $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$, $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ in first matrix there diagonal entries are non-zero which are 1 and 2. In second matrix there is at least one entry which is non-zero -1.
25)	**Option A. Any integer**
26)	**Option D.** $\frac{constant\ term}{coefficient\ of\ x^2}$
27)	**Option A.**
28)	**Option C.**
29)	**Option B.** $\boldsymbol{a_{n+1} - a_n}$ **Explanation:** $d = a_{n+1} - a_n$ *d is called common differece* for example in a sequence $\{a_n\}$={3,5,7,9,…} $d = 5 - 3 = 7 - 5 = 9 - 7 = 2$
30)	**Option A.** $\boldsymbol{a_n = a + (n-1)d}$ **Explanation:** for the nth term of an A.P.: We know that an - an-1 = d (n > 1), which implies an = an-1 + d (n > 1)...... (i) Putting n = 2, 3, 4,...in (i) we get a2 = a1 + d = a1 + (2 - 1)d a3 = a2 + d = (a1 + d) + d = a1 + 2d = a1 + (3 - 1)d a4 = a3 + d = (a1 + 2d) + d = a1 + 3d

	= a1 + (4 - 1)d Thus we conclude that an = a1 + (n - 1)d
31)	**Option A. P(8,5)**
32)	**Option A. 60** **Explanation:** $5p_3 = \frac{5!}{(5-3)!} = 60$
33)	**Option A.** 2^{2n}
34)	**Option C.** $\left(\frac{n+1}{2}\right) th\ and \left(\frac{n+3}{2}\right) th\ term$
35)	**Option A. 9/2π** **Explanation:** r=18 $\theta = 45$ $\theta = 45\left(\frac{\pi}{180}\right) = \frac{9\pi}{36}$ $l = r\theta = 18\left(\frac{9\pi}{36}\right) = \frac{9\pi}{2}$
36)	**Option A.** $1/2r^2\theta$
37)	**Option B:** $2sin\alpha cos\alpha$ (Trick: Consider L.H.S=R.H.S)
38)	**Option A:** $90^0 + \theta$ (Allied angle is always from axis like 90, 180, 270, 360)
39)	**Option D:** 8π **EXPLANATION:** $2cosec\frac{x}{4} = 2cosec(\frac{x}{4} + 2\pi)$ $= 2cosec\frac{1}{4}(x + 8\pi)$ Hence is 8π is period.
40)	**Option B:** 7π **EXPLANATION:** $3tan\frac{x}{7} = 3tan(\frac{x}{7} + \pi)$ $= 3tan\frac{1}{7}(x + 7\pi)$ Hence is 7π is period.

41) **Option C:** Pythagoras theorem

EXPLANATION:

The law of cosine is;

$$a^2 = b^2 + c^2 - 2bc\cos\alpha$$

For angle 90° the value of the $\cos 90° = 0$ and the term 2bc will vanish so the final form will be reduced to the Pythagoras' Theorem which is.

$$a^2 = b^2 + c^2$$

42) **Option A:** $\sin\frac{\alpha}{2}$

EXPNALATION:

$$\boldsymbol{s = \frac{a+b+c}{2}}$$

$$2\sin^2\left(\frac{A}{2}\right) = 1-\cos(A) = 1-\frac{b^2+c^2-a^2}{2bc} = \frac{(a+b-c)(a-b+c)}{2bc} = \frac{2(s-b)(s-c)}{bc}$$

So

$$\sin\left(\frac{A}{2}\right) = \sqrt{\frac{(s-b)(s-c)}{bc}}$$

43) **Option D:** $-\frac{1}{\sqrt{3}}$

EXPLANATION:

Tan ($\sin^{-1}(-1/2)$) = $-\frac{1}{\sqrt{3}}$ as $\quad \sin - 1\left(-\frac{1}{2}\right) = -30°$

44) **Option A:** $\text{Sin}^{-1}(A\sqrt{1-B^2}+B\sqrt{1-A^2})$

Explanation:

By Fomula,

$$\sin^{-1}A+\sin^{-1}B = \text{Sin}^{-1}(A\sqrt{1-B^2}+B\sqrt{1-A^2})$$

45) **Option A:** $\left\{\frac{\pi}{4}+n\pi,\ \frac{5\pi}{4}+n\pi\right\}$

(Trick: value 1 is get on the angle of $\frac{\pi}{4},\frac{5\pi}{4}$ and tan interval is $n\pi$)

46) **Option A:** $\frac{\pi}{8}$

	(Trick: -1 is get on the angle of $\frac{\pi}{8}$)
47)	**Option a. undefined** **Explanation:** $= \lim_{x \to a} \frac{x^3 - a^3}{x - a}$ $= \frac{a^3 - a^3}{a - a}$ $= \frac{0}{0}$ Hence undefined
48)	**Option b. e** **Explanation:** $= \lim_{x \to 0} (1 + x)^{1/x}$ $\lim_{x \to 0} (1 + x)^{\frac{1}{x}}$ $(1 + 0)^{\frac{1}{0}}$ $(1)^{\infty}$ e
49)	**Option c $4e^{2x}$** **Explanation:** $y = e^{2x}$ $y' = 2e^{2x}$ $y_2 = 4e^{2x}$
50)	**Option d $na(ax + b)^{n-1}$**

	Explanation: $\frac{d}{ax}(ax+b)^n = n(ax+b)^{n-1}\left[\frac{d}{dx}(ax+b)\right]$ $na(ax+b)^{n-1}$
51)	**Option b: 54.6 x 10^{-8}m** **Explanation:** 546 nm= 546 x 10^{-9} = 54.6 x 10^{-8}m
52)	**Option b: 5732°** **Explanation:** 100rad X 180/ π = 5729.58
53)	**Option b: Right hand rule** **Explanation:** Because the direction of vector product is given by right hand rule that is the direction of the product vector is perpendicular to this plane. Rotate the first vector A into B through the smaller of the two possible angles and curl the fingers to the right hand. In the direction of rotation, keeping the thumb erect. The direction of the product vector will be along the erect thumb.
54)	**Option c: 3rd quadrant** **Explanation:** Because, • In 1st quadrant both components of a vector are positive • In 2nd quadrant 1 components of a vector is positive and other is negative. • In 3rd quadrant both components of a vector are negative. • In 4th quadrant 1 components of a vector is positive and other is negative.
55)	**Option d: 40° and 50°** **Explanation:** Range = $V_i^2/g \sin 2\theta$

56)	**Option b: are inertial** **Explanation:** Frame of reference in which newton's law of motion hold is known as inertial frame of reference.
57)	**Option (d)**The ratio of the force applied to the machine to the force exerted by it **Explanation:** Mechanical advantage is the ratio of the output force to the input force, so it can be represented by the equation: Note that this equation represents the actual mechanical advantage of a machine. The actual mechanical advantage takes into account the amount of the input force that is used to overcome friction.
58)	**Option d: 20 J** **Explanation:** W = Fd = 4 x 5 = 20 J
59)	**Option a:** ***(Kgm_2)*** Explanation: The amount of torque needed to cause any given angular acceleration (the rate of change in angular velocity) is proportional to the **moment of inertia** of the body. **Moment of inertia** may be **expressed** in units of kilogram meter squared (kg. m^2) in SI units and pound-foot-second squared (lbf. ... s^2) in imperial or US units.
60)	**Option d: (r×p)** Explanation: **Angular Momentum** for a Single Particle. ... Notice that this equation is equivalent to $l = rp \sin\theta$, where **p** is the linear **momentum** of the particle: a particle does not need to move in a circular path to possess **angular momentum**.
61)	**Option b: Stoke's law**
62)	**Option d: Spherical**

	Explanation: The volume flux, through a tube bounded by a surface of some constant value ψ, is equal to $2\pi\ \psi$ and is constant. For other shapes than spherical, σ is not constant along the body surface. Integration of the viscous force per unit area σ over the sphere surface gives the frictional force F_d according to Stokes' law.
63)	**Option c: 90°** **Explanation:** $X = X_o$ constant $Wt = 90^\circ$ **So,** $X = X_o$
64)	**Option C : Both displacement and direction** **Explanation:** Because in equation $X = X_o$ constant 'not' is phase constant $W = 2\pi r$ Where, 2π tells angle and r displacement.
65)	**Option a: 0.61 ms^{-1}**
66)	**Option c: elasticity** **Explanation:** The distances between molecules in solids are very small, i.e., solids are more dense - as compared to liquids and gases. Because they are so close, than can collide very quickly, i.e. it takes less time for a molecule of the solid to 'bump' into its neighbor. Solids are packed together tighter than liquids and gases, hence sound travels fastest in solids. The distances in liquids are shorter than in gases, but longer than in solids. Liquids are more dense than gases, but less dense than solids, so sound travels 2nd fast in liquids. Gases are the slowest because they are the least dense: the molecules in gases are very far apart, compared with solids and liquids.

67)	**Option b: $\lambda/2$** **Explanation:** When a wave enters a different medium, its wavelength and speed change, but its frequency remains the same. ... From a crest to a trough is a distance of $\lambda/2$. A change of phase of 180° or π is equivalent to a path difference of $\lambda/2$.
68)	**Option A:0°** **Explanation:** When light travels from a denser medium to a rarer medium, it bends away from the normal, as illustrated to the left. This behavior follows from Snell's Law. As you saw before, the larger angle must be in the medium having the lower index of refraction.
69)	**Option C: 10-^{10m}** **Explanation:** One angstrom is equal to 10^{-10} m (one ten-billionth of a meter or 0.1 nanometers). Although the unit is recognized world-wide, it is not an International System (SI) or metric unit. The symbol for angstrom is Å, which is a letter in the Swedish alphabet.
70)	**Option D: Bragg's Equation** **Explanation:** A law in physics: there is a definite relationship between the angle at which a beam of X rays must fall on the parallel planes of atoms in a crystal in order that there be strong reflection, the wavelength of the X rays, and the distance between the crystal planes : $\sin \Theta = n\lambda / 2d$
71)	**Option b: $(qp1 + dfe)$** **Explanation:** Compound microscope is an optical instrument which is used to obtain high magnification. In order to determine the magnifying power of acompound microscope ,we consider an object .Magnification
72)	**Option d: fo-fe** **Explanation:** ASTRONOMICAL TELESCOPE-MAGNIFYING POWER. It is an optical instrument used to view heavenly bodies such as moon stars, planets and distant object. The objective is a convex lens of large focal length and large aperture

73)	**Option a: fo+fe** **Explanation:** .An astronomical telescope works on the principle that when an object to be mag. ... and an eye piece E. the focal length fo of the objective lens of astronomical telescope is ... whose position is adjusted so that the image lies between the focus *fe*'.
74)	**Option c: Greater than critical angel** **Explanation:** Total internal reflection is a phenomenon that occurs at the boundary between two mediums, such that if the incident angle in the first medium is greater than the critical angle, then all the light is reflected back into that medium.
75)	**Option c: $\gamma = CP/CV$**
76)	**Option b: Cp >Cv**
77)	**Option d : $1.38 \times 10{-}23JK{-}1$**
78)	**Option C: Diffraction** **Explanation:** Diffraction of Light: light bending around an object. Diffraction is the slight bending of light as it passes around the edge of an object. The amount of bending depends on the relative size of the wavelength of light to the size of the opening.
79)	**Option A: Refraction** **Explanation:** Refraction of Light: as it passes from more dense to less dense mediums. The bending of light as itpasses from one medium to another is called refraction. The angle and wavelength at which thelight enters a substance and the density of that substance determine how much the light is refracted.
80)	**Option c: one forth** **Explanation:** If radius becomes half then r' = r/2 New Vt'=? Vt'/Vt = r'>2/r>2 By plugging in the value of r' in the above relation.

	Vt'/Vt = (r/2)>2/r>2 Vt'/Vt = 1/4 Vt' = Vt/4
81)	**Option a. Mendeleev's periodic Law** **Explanation:** Mendeleev arranged elements in 1869 in the increasing order of their atomic masses or weights. He put forward his law as Mendeleev's periodic law. He observed that properties of elements with slight modification are repeating themselves at intervals.
82)	**Option d. Zn and Ca** **Explanation:** Calcium and Zinc are dissimilar because other pairs are located in the same group, so they have same number of valence electrons, due to which most of their properties are same. But Calcium and Zinc are located in different groups. Hence they are dissimilar.
83)	**Option a. 12** **Explanation:** Mendeleev's table has 12 horizontal columns called as periods
84)	**Option a: $CaOCl_2$** **Explanation:** 1. It is used as bleaching agent in textile industry. 2. It is used in the purification of drinking water.
85)	**Option d: Red** **Explanation:** The flame test is a fun and useful analytical technique to help you identify the chemical composition of a sample based on the way it changes the color of a flame. However, interpreting your results can be tricky if you don't have a reference. There are many shades of green, red, and blue, usually described with color names you wouldn't find on even a large crayon box! The flame test color for strontium is the red of emergency flares and red fireworks. It's a deep crimson to brick red.
86)	**Option c: $CaCl_2$** **Explanation:**

Calcium chloride is an inorganic compound, a salt with the chemical formula $CaCl_2$. It is a white coloured crystalline solid at room temperature, highly soluble in water. Calcium chloride is commonly encountered as a hydrated solid with generic formula $CaCl_2$.

87) **Option a: Magnesium nitrate**

Explanation:

On heating an alkali earth metal or its salt, the electrons are excited easily to higher energy levels because of absorption of energy.

When these electrons return to their ground states, they emit extra energy in form of radiations which fall in the visible region thereby imparting a characteristic colour to the flame.

Ba and Mg do not impart any colour to the fame i.e. they do not give flame test. This is due to their very small size. Ca, Sr and Ba impart brick red, Blood red and Apple green colours respectively to the flame.

88) **Option a**

Explanation:

it consists of one central sulfur atom surrounded by four equivalent oxygen atoms in a tetrahedral arrangement. The sulfate ion carries a negative two charge and is the conjugate base of the hydrogen sulfate ion, HSO4-, which is the conjugate base of H2SO4, sulfuric acid.

89) **Option b**

Explanation:

Dinitrogentetraoxide (N_2O_4) has a very weak N-N bond and is in equilibrium with NO_2. It is a diamagnetic substance. It reacts with water to form nitrous and nitric acids and it oxidizes many metals.

90) **Option a**

Explanation:

The conjugate acid of the phosphite anion is phosphorous acid (H3PO3). Other names for this acid are orthophosphorous acid and dihydroxyphosphine oxide. PHOSPHOROUS ACID is a white or yellow crystalline solid (melting point 70.1 deg C) or a solution of the solid. Orthophosphoric acid is a tribasic acid. It has three ionisable hydrogen atoms. Hence, it is a tribasic acid.

91) **Option a**

Explanation:

	Bond strength decreases with increase in the size of halogen.
92)	**Option a** **Explanation:** Iodine is usually used in an alcohol solution (called tincture of iodine) or as Lugol's iodine solution as a pre- and postoperative antiseptic. Some people do not recommend disinfecting minor wounds with iodine because of concern that it may induce scar tissue formation and increase healing time. However, concentrations of 1% iodine or less have not been shown to increase healing time and are not otherwise distinguishable from treatment with saline. Novel iodine antiseptics containing povidone-iodine (an iodophor, complex of povidone, a water-soluble polymer, with triiodide anions I3-, containing about 10% of active iodine) are far better tolerated, do not negatively affect wound healing, and leave a deposit of active iodine, thereby creating the so-called "remnant", or persistent, effect. The great advantage of iodine antiseptics is their wide scope of antimicrobial activity, killing all principal pathogens and, given enough time, even spores, which are considered to be the most difficult form of microorganisms to be inactivated by disinfectants and antiseptics.
93)	**Option c** **Explanation:** SF_3CL_3 is similar to SF_6 thus octahedral
94)	**Option c** **Explanation:** The lone pairs on the two nitrogen atoms can form coordinate bonds with a metal or metal ion.
95)	**Option d** **Explanation:** The electron configuration for chromium is **not** 1s22s22p63s23p63d44s2, but 1s22s22p63s23p63d54s1. Interestingly enough, Tungsten is more stable with an electron arrangement of [Xe] 4f145d46s2. Unfortunately, there is no easy way to explain these deviations in the ideal order for each element.
96)	**Option b** **Explanation**: Naphthalene has fused ring of aromaticity and has the simplest

	structure when compared with other polycyclic aromatic hydrocarbons.
97)	**Option b** **Explanation**: Arenes are insoluble in water and hence they are non-polar compounds.
98)	Option b **Explanation:** **Hydration of alkene is electrophilic addition of H_2O to alkenes which forms alcohol not alkyl halides.**
99)	Option a Explanation: The best method of preparation of alkyl halides is a reaction of alcohol with $SOCl_2$/ Pyridine because by-products formed in the reaction are SO_2 and HCl which are in gaseous form and escape into the atmosphere leaving behind pure alkyl chlorides. $CH_3CH_2{-}OH + SOCl_2 \rightarrow CH_3CH_2{-}Cl + SO_2\uparrow + HCl\uparrow$
100)	**Option a** **Explanation:** Tartaric acid is a white crystalline organic acid that occurs naturally in many fruits, most notably in grapes, but also in bananas, tamarinds, and citrus. Its salt, potassium bitartrate, commonly known as cream of tartar, develops naturally in the process of winemaking.

YOUR HEALTH IS AN
INVESTMENT,
NOT AN EXPENSE

Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practice.

Read the following passage and answer the questions given at the end.

Mount Vesuvius, a volcano located between the ancient Italian cities of Pompeii and Herculaneum, has received much attention because of its frequent and destructive eruptions. The most famous of these eruptions occurred in A.D. 79.

The volcano had been inactive for centuries. There was little warning of the coming eruption, although one account unearthed by archaeologists says that a hard rain and a strong wind had disturbed the celestial calm during the preceding night. Early the next morning, the volcano poured a huge river of molten rock down upon Herculaneum, completely burying the city and filling the harbor with coagulated lava.

Meanwhile, on the other side of the mountain, cinders, stone and ash rained down on Pompeii. Sparks from the burning ash ignited the combustible rooftops quickly. Large portions of the city were destroyed in the conflagration. Fire, however, was not the only cause of destruction. Poisonous sulfuric gases saturated the air. These heavy gases were not buoyant in the atmosphere and therefore sank toward the earth and suffocated people.

Over the years, excavations of Pompeii and Herculaneum have revealed a great deal about the behavior of the volcano. By analyzing data, much as a zoologist dissects an animal specimen, scientists have concluded that the eruption changed large portions of the area's geography. For instance, it turned the Sarno River from its course and raised the level of the beach along the Bay of Naples. Meteorologists studying these events have also concluded that Vesuvius caused a huge tidal wave that affected the world's climate.

In addition to making these investigations, archaeologists have been able to study the skeletons of victims by using distilled water to wash away the volcanic ash. By strengthening the brittle bones with acrylic paint, scientists have been able to examine the skeletons and draw conclusions about the diet and habits of the residents. Finally, the excavations at both Pompeii and Herculaneum have yielded many examples of classical art, such as jewelry made of bronze, which is an alloy of copper and tin. The eruption of Mount Vesuvius and its tragic consequences have provided everyone with a wealth of data about the effects that volcanoes can have on the surrounding area. Today, volcanologists can locate and predict eruptions, saving lives and preventing the destruction of other cities and cultures.

Question 1. Herculaneum and its harbor were buried under _________ lava.

a. liquid
b. solid
c. flowing
d. gas
e. Answer not available

Question 2. The poisonous gases were not _________ in the air.

[✓ a.] able to float
b. visible
c. able to evaporate
d. invisible
e. able to condense

Question 3. Scientists analyzed data about Vesuvius in the same way that a zoologist ________ a specimen.

a. describes in detail
b. studies by cutting apart
c. photographs
d. chart
[✓ e.] Answer not available

Question 4. ________ have concluded that the volcanic eruption caused a tidal wave.

a. Scientists who study oceans
b. Scientists who study atmospheric conditions
c. Scientists who study as'.
d. Scientists who study animal behavior
[✓ e.] Answer not available in article

Question 5. Scientists have used ________ water to wash away volcanic ash from the skeletons of victims.

a. bottled
b. volcanic
[✓ c.] purified
d. sea
e. fountain

Question 6. Despite assorted effusion to the contrary, there is no necessary link between scientific skill and humanism, and quite possibly, there may be something of a _______ between them.

A. dichotomy
B. congruity
[✓ C.] generosity
D. fusion

Question 7. Ironically, the party leaders encountered no greater _______ their efforts to build as Progressive Party than the ____ of the progressive already elected to the legislature.

[✓ A.] obstacle to – resistance
B. support for - advocacy
C. praise for - reputation
D. threat to - promise

Question 8. No longer ______ by the belief that the world around us was expressly designed for humanity, many people try to find intellectual ___ for that lost certainty in astrology and in mysticism.

A. satisfied - reasons
B. reassured - justifications
C. restricted - parallels
[✓ D. sustained – substitutes]

Question 9. Ecology, like economics, concerns itself with the movement of valuable ____ through a complex network of producers and consumers.

a. nutrients
b. dividends
[✓ c. communications]
d. artifacts

Question 10. In his usual _____ manner, he had insured himself against this type of loss.

a. pensive
b. providential
c. indifferent
[✓ d. circumspect]

Write antonyms of the following:

Question 11. SCURRILOUS:

[✓ a. Decent]
b. savage
c. major
d. volatile

Question 12. TOUT

a. cast aspersions on
b. deny the relevance of
[✓ **c.** misrepresent]
d. withhold consent

Question 13. SCOTCH

a. renovate
b. entrust
c. unfasten
[✓ d. encourage]

Question 14. OUTLANDISH

[✓ a. Conventional]
b. prolific
c. unchanging
d. transparent

Question 15. FERVID

a. undistinguished
b. unexpected
c. stubborn

[✓ d.] restrained

Choose the correct Analogies.

Question 16. CONFIRMED: INVETERATE

A.knowledge : supposed
[✓ **B.**]financial : bankrupt
C.immature : callow
D.credible : incredible

Question 17. DORY: VAN

A.dairy : cow
B.fish : vehicle
[✓ **C.**]freighter : caisson
D. runners : wheels

Question 18. NEEDLE: KNIT

A.bait : fish
B.match : fire
[✓ **C.**]loom : weave
D.soap : wash

Question 19. EXTROVERT: RETICENT

a. reprobate : humility
b. strategist : decisiveness
c. zealot : loyalty
[✓ d.] maverick : conformity

Question 20. HYGROMETER: BAROMETER

a. snow : rain
[✓ b.] humidity : pressure
c. water : mercury
d. temperature : weather

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 21. For a, b c € r if a > b and c < 0 , then

(a) a+b<b+c (b) ac > bc [✓ (c)] ac < bc (d) a-b<0

Question 22. The set {1, -1} is closed w. R. T

(a) addition. [✓ (b)] multiplication (c) subtraction (d) none

Question 23. The set {1} has closure property w. R. T

(a) addition (b) subtraction n [✓ (c)] division (d) none

Question 24. If a/b=ka/kb, k≠0 then this rule is called:

(a) rules of product of fraction (b) golden rule of fraction

[✓ (c)]rules of quotient of fractions (d)principle for equality of fraction

Question 25. x-a is a factor of x^n-a^n, where n is

[✓ a.] Any integer
b. Any positive integer
c. Any odd number
d. Any real number

Question 26. Product of roots of any quadratic equation is

a. $\frac{coefficient\ of\ x^2}{coefficient\ of\ x}$
b. $\frac{coefficient\ of\ x}{coefficient\ of\ x^2}$
c. $-\frac{coefficient\ of\ x}{coefficient\ of\ x^2}$
[✓ d.] $\frac{constant\ term}{coefficient\ of\ x^2}$

Question 27. The partial fraction of $\frac{x^2-10x+13}{(x-1)(x^2-5x+6)}$ are of the form

[✓ a.] $\frac{A}{x-1}+\frac{Bx+C}{x-3}+\frac{Dx+E}{x-2}$
b. $\frac{A}{x-1}+\frac{B}{x-3}+\frac{C}{x-2}$
c. $\frac{Ax+B}{x-1}+\frac{C}{x^2-5x+6}$
d. Non of these

Question 28. The number of partial fraction of $\frac{x^3}{x(x+1)(x^2\_1)}$ are

a. 2
b. 3
[✓ c.] 4
d. None

Question 29. Two matrix A and B are conformable for multiplication AB if

[✓ a)] number of columns in A= number of rows in B
b) number of rows in B = number of columns in A
c) number of rows in A= number of rows in B
d) number of columns in A = number of columns in B

Question 30. If A is of Order 2×3 and B of order 4x2 , then order of BA

(a) 2x2 (b) 3×4 (c)4×3 4 [✓ (d)] Non

Question 31. If AB=BA, then which is true

(a) A and B are multiplicative inverse of each other
(b) One of A or B is null matrix
4 [✓ (c)] One of A or B is identity matrix
(d) All of these.

Question 32. If A is any square matrix of order 3 is multiplied by k, then value of $|kA|$ is equal to

(a) $|k||A|$ (b) $k|A|$ (c) $|A|$ [✓ (d) $k3|A|$]

Question 33. $\binom{2n}{0}+\binom{2n}{1}+\binom{2n}{2}+\cdots+\binom{2n}{2n}$ is equal to

[✓ a. 2^n]
b. 2^{2n}
c. 2^{2n-1}
[✓ d. 2^{2n+1}]

Question 34. If n is odd then middle term/s is $(a+x)^n$ is/are

[✓ a. $\left(\frac{n+1}{2}\right)$ *th term*]
b. $\left(\frac{n}{2}+1\right)$ *th term*
[✓ c. $\left(\frac{n+1}{2}\right)$ *th and* $\left(\frac{n+3}{2}\right)$ *th term*]
d. $\left(\frac{n}{2}+1\right)$ *th and* $\left(\frac{n}{2}+2\right)$ *th term*

Question 35. If θ=45^0, r=18mm then l is equal to

[✓ a. $9/2\pi$]
b. $2/9\pi$
c. 810
d. 810mm

Question 36. Area of sector of circle of radius r is

[✓ a. $1/2r^2\theta$]
b. $1/2r\theta^2$
c. $½(r\theta)^2$
d. $1/2r^2\theta$

Question 37. The A.M. between $\sqrt{2}$ and $3\sqrt{2}$ is

[✓ a) $4\sqrt{2}$]
b) $\frac{4}{\sqrt{2}}$
c) $\sqrt{2}$
d) None of these

Question 38. The sum of terms of a sequence is called

a) Partial sum
[✓ b) Series]
c) Finite sum
d) None of these

Question 39. Fourth partial sum of the sequence $\{n^2\}$ is

a) 16
[✓ b) 1+4+9+16]
c) 8

d) 1+2+3+4

Question 40. Sum of n terms of an arithmetic series S_n is equal to

[✓ a)] $\frac{n}{2}[2a+(n-1)d]$

b) $\frac{n}{2}[a+(n-1)d]$

c) $\frac{n}{2}[2a+(n+1)d]$

d) $\frac{n}{2}(2a+l)$

Question 41. Middle term/s in the expansion of $(a-3x)^{14}$ is/are

a) T_7

[✓ b)] T_8

c) T_6 & T_7

d) T_7 & T_8

Question 42. 6th term of the expansion $(a+2x)^{13}$ is

[✓ a)] $\binom{13}{5}a^8x^5$

b) $\binom{13}{5}a^8 2^5 x^5$

c) $\binom{13}{5}a^5x^8$

d) $\binom{13}{5}a^5 2^8 x^8$

Question 43. Tan $(\sin^{-1}(-1/2))=$……

a. $\sqrt{3}$

b. $-\sqrt{3}$

c. $\frac{1}{\sqrt{3}}$

[✓ d.] $-\frac{1}{\sqrt{3}}$

Question 44. $\sin^{-1}A+\sin^{-1}B$ is equal to

[✓ a.] $\sin^{-1}(A\sqrt{1-B^2}+B\sqrt{1-A^2})$

b. $\sin^{-1}(A\sqrt{1-B^2}-B\sqrt{1-A^2})$

c. $\sin^{-1}(B\sqrt{1-A^2}-A\sqrt{1-B^2})$

d. $\sin^{-1}(AB\sqrt{(1-A^2)(1-B^2)})$

Question 45. General solution of $tanx=1$ is:

[✓ a.] $\left\{\frac{\pi}{4}+n\pi,\ \frac{5\pi}{4}+n\pi\right\}$

b. $\left\{\frac{\pi}{4}+2n\pi,\ \frac{5\pi}{4}+2n\pi\right\}$

c. $\left\{\frac{\pi}{4}+n\pi,\ \frac{3\pi}{4}+n\pi\right\}$

d. $\left\{\frac{\pi}{4}+2n\pi,\ \frac{3\pi}{4}+2n\pi\right\}, n\epsilon Z$

Question 46. If $tan2x=-1$, then solution in the interval $[0,\pi]$ is:

[✓ a.] $\frac{\pi}{8}$

b. $\frac{\pi}{4}$

c. $\frac{3\pi}{8}$
d. $\frac{3\pi}{4}$

Question 47. $\lim_{x \to a} \frac{x^3 - a^3}{x - a} = ?$

[✓ a. Undefined]
b. $3a^2$
c. a^2
d. 0

Question 48. $\sec\theta \csc\theta \sin\theta \cos\theta =$

[✓ a. 1]
b. 0
c. $\sin\theta$
d. $CosQ$

Question 49. The point (0,-1) lies on terminal side of the angle

a. 0^0
b. 90^0
c. 180^0
[✓ d. 270]

Question 50. $\frac{d}{dx}(ax + b)^n = ?$

a. $n(a^{n-1}x + b)$
b. $n(ax + b)^{n-1}$
c. $n(a^{n-1}x)$
[✓ d. $na(ax + b)^{n-1}$]

Section (III):Physics (Questions 51-80)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 51. If the wavelength of green line of the visible spectrum is 546 nm, what is its value in meters?

a) 54.6×10^{9} m	[✓ b) 54.6×10^{-8} m]
c) 546×10^{-19} m	d) 546×10−10 m

Question 52. "100 radians" are equal to how much degrees?

(a) 57.3° [✓ b) 5732°] c) 573° d) 5.73°

Question 53. The direction of vector product is given by:

(a) Head to tail rule	[✓ b) right hand rule]
c) Left hand rule	d) triangle rule

Question 54. If the wavelength of green line of the visible spectrum is 546 nm, what is its value in meters?

a) 54.6×10^{9} m	[✓ b) 54.6×10^{-8} m]
c) 546×10^{-19} m	d) 546×10−10 m

Question 55. "100 radians" are equal to how much degrees?

(a)57.3° [✓ b) 5732°] c) 573° d) 5.73°

Question 56. Which one is the highest power multiple:

[✓ a) Giga] b) mega c) kilo d) deca

Question 57. The mechanical advantage of any machine is:

a) The efficiency of the machine the work done by the machine
b) The ratio of the work done by the machine to the work expended on it
c) The ratio of the force exerted by the machine to the force applied to it
[✓ d) The ratio of the force applied to the machine to the force exerted by it]

Question 58. A 2-kg object is moving at 3m/s. A 4-N force is applied in the direction of motion and then removed after the object has travelled an additional 5m.

The work done by this force is:

a) 12J b) 15J c) 18J [✓ d) 20J]

Question 59. Moment of inertia is measured in:

[✓ a) $kgm2$] b) $kgm{-}2$ c) Ns d) rad/s

Question 60. The angular momentum is given by:

a) mω b) ω × F c) r × F [✓ d) r × p]

Question 61. A ball thrown up with a velocity of $19.6ms^{-1}$ return back to its thrower's hand after

a) 1s [✓ b) 2s] c) 3s d) 4s

Question 62. The horizontal range of a projectile is the same for the angles

a) 60° and 80° b) 40° and 70°
c) 45° and 55° [✓ d) 40° and 50°]

Question 63. Laws of motion are valid in those systems which:

a) Are non-inertial [✓ b) are inertial] c)are at rest d) are in space

Question 64. Area under the velocity -time graph represents:

a) Speed b) momentum
c) Velocity [✓ d) distance covered]

Question 65. Increase in velocity of sound in air for $1°C$ rise in temperature is:

[✓ a) $0.61\ ms^{-1}$] b) $61\ ms^{-1}$ c) $1.61\ m^{-1}s$ d) $2ms^{-1}$

Question 66. The speed of sound is greater in solids than in gases due to high value of:

a) Density b) Pressure [✓ c) Elasticity] d) Temperature

Question 67. Phase difference of 180° is equivalent to a path difference of:

a)λ [✓ b) $\lambda/2$] c)$\lambda/4$ d)$\lambda/8$

Question 68. Camping equipment weighing 6000N is pulled across a frozen lake by means of a horizontal rope. The co efficient of kinetic friction is 0.05. How much work is done by the campers in pulling the equipment 1000m if its speed is increasing at the constant rate of 0.20m/s2?

a) −1.2×106 J b) 1.8×105 J c) 3.0×105 J [✓ d) 4.2×105 J]

Question 69. A 1-kg block is lifted vertically 1m by a boy. The work done by the boy is about:

a) 1ft· lb b) 1J [✓ c) 10J] d) 0.1J E. zero

Question 70. 0.50-kg object moves in a horizontal circular track with a radius of 2.5m. An external force of 3.0N, always tangent to the track, causes the object to speed up as it goes around. The work done by the external force as the mass makes one revolution is:

a) 24J [✓ b) 47J] c) 59J d) 94J

Question 71. A man pushes an 80-N crate a distance of 5.0m upward along a frictionless slope that makes an angle of 30° with the horizontal. His force is parallel to the slope. If the speed of the crate decreases at a rate of 1.5m/s2, then the work done by the man is:

a) −200J b) 61J [✓ c) 140J] d) 200J

Question 72. The magnifying power of an astronomical telescope is:

a) $f0 + fe$ b) $f0 - fe$ c) $f0fe$ [✓ d) $f0fe$]

Question 73. For normal adjustment, the length of astronomical telescope is:

[✓ a) $f0 + fe$] b) $f0 - fe$ c) $f0fe$ d) $f0fe$

Question 74. For the phenomenon of total internal reflection, the angle of incidence should be:

a) Equal to critical angle b) Smaller than critical angle

[✓ c) Greater than critical angle] d) Zero

Question 75. Which one of the following is nearly monochromatic light?

a) Light form fluorescent tube [✓ b) Light form sodium lamp]

c) Light form neon lamp d) Light form simple lamp

Question 76. Two sources of light are coherent if they emit rays of:

a) same wavelength

b) Same amplitude of vibration

[✓ c) Same wave length with constant phase difference]

d) Same amplitude and wavelength

Question 77. Sodium chloride in a flame gives out pure:

a) Blue light [✓ b) Yellow light] c) Red light d) White light

Question 78. When crest of one wave falls over the trough of the other wave, this phenomenon is known as:

a) Polarization [✓ b) Constructive interference]

c) Destructive interference d) Diffraction

Question 79. The bending of beam of light when it pass from one medium to another is known as:

a) Refraction [✓ b) Reflection] c) Diffraction d) Dispersion

Question 80. If radius of droplet becomes half then its terminal velocity will be:

a) Half b) Double [✓ c) One forth] d) Four times

Section (IV): Chemistry (Questions 81-100)

==> THIS SECTION IS ONLY FOR CANDIDATES APPLYING IN MS CHEMISTRY

Question 81. Soap secum is often composed of

a. Magnesium
[✓ b. Calcium state]
c. Aluminum
d. Strontium chloride

Question 82. Which of the following equations is not actually observed?

a. $2Mg+CO_2 \rightarrow 2MgO+C$
b. $2Mg+SO_2 \rightarrow 2MgO+S$
[✓ c.] $2Ca+CO_2 \rightarrow 2CaO+C$
d. All of them

Question 83. Castner kellner cell used in the manufacture of caustic soda, cathode is

a. Pt rod
b. Graphite rod
[✓ c.] Moving mercury
d. None of them

Question 84. The composition of Bleaching Powder for simplicity is expressed as

[✓ a.] $CaOCl_2$
b. KNO_2
c. KNO_3
d. None of them

Question 85. The flame test color of strontium is

a. Purple
b. Pink
c. range
[✓ d.] Red

Question 86. Electron negativity decreases down the group in all the p block elements excepts

a) I-A
b) III-B
[✓ c)] III-A
d) III-C

Question 87. Orthoboric acid is obtained from the following

[✓ a.] $Na_2B_4O_9 + 3HCL + 5H_2O \rightarrow 4H_5BO_3 + 2NACl$
b. $Na_2B_4O_7 + 2HCL + 5H_2O \rightarrow 7H_3BO_3 + 2NACl$
c. $Na_2B_4O_7 + 2HCL + 5H_2O \rightarrow 4H_3BO_3 + 3NACl$
d. $Na_2B_4O_7 + 2HCL + 5H_2O \rightarrow 4H_3BO + 2NACl$

Question 88. Diamond form of Carbon do not conduct electricity due to absence of

a. Spectators electrons
[✓ b.] Delocalized electrons
c. Free electrons
d. Ions

Question 89. Dinitrogentetraoxide has a very weak

a) S-S bond [✓ b)]N-N bond c)Both a and b d)None of them

Question 90. Orthophosphoric acid is a

[✓ a)] Tribasic acid b)Base c)Monobasic acid d)Di basic acid

Question 91. Which of the following sets gives the correct arrangement of the compounds involved based on their bond strengths?

[✓ a)] HF>HCl>HBR>HI b)HF > HCl > HI > HBR

c)HF > HI > HCl > HBR d)HCl > HF > HI > HBR

Question 92. Which of the following is antiseptic?

[✓ b)] I b)Br c)Cl d)F

Question 93. The shape of the molecule SF3Cl3 is

c) Trigonalbipyramidal b)Cubic [✓ c)]Octahedral d)Square pyramidal

Question 94. Which is an example of a bidentate ligand?

a. H2O
b. Cl(-ve)
[✓ c.] H2NCH2CH2NH2
d. OH(-)

Question 95. The correct electronic configuration of Cr is

a. [Ar]4s23d4
b. [Ar]4s2d4
[✓ c.] [Ar] 4s03d5
d. [Ar]4s13d5

Question 96. Phenanthrene is a fused polycyclic compound contains ______ benzene rings

a. Two
[✓ b.] Three
c. Four
d. Five

Question 97. Aniline is a derivative of benzene which contains

a. Imino group
[✓ b.] Amino group
c. Both a and b
d. Neither a nor b

Question 98. Which of the following is not the method of preparation of alkyl halide?

(a) Darzen's method
[✓ (b)] Hydration of alkene
(c) Both a and b
(d) Neither a nor b

Question 99. Water gas heated at 450?C and 200 atm pressure in the presence of ZnO+Cr2O3 will produce

[✓ (a)] Methanol
(b) Ethanol
(c) Methane
(d) methanol

Question 100.

Question 1. the formula of starch is

[✓ (a)] (C6H10O5)n
(b) C6H10O6
(c) C6H12O5
(d) All of them

1)	E
2)	A
3)	E
4)	E
5)	C
6)	C
7)	A
8)	D
9)	**C**
10)	**D**
11)	A
12)	C
13)	D
14)	**A**
15)	**D**
16)	B
17)	C
18)	C
19)	**D**
20)	**B**
21)	Option C. $ac < bc$ Explanation: One of the properties from the multiplicative properties of the inequalities of the real numbers.
22)	**Option B. Multiplication.** **Explanation:** This is according to the closure property of the multiplication. because in this set closure property only holds for multiplication. For example

	1*1=1 1*(-1)= -1 -1 * -1= 1
23)	**Option C. Division** **Explanation:** According to the closure property of division. because in this set closure property holds for division. 1/1= 1
24)	**Option C. Rules of the quotient of fractions.** **Explanation:** This is multiplication rule of quotient of fractions. It states that if we multiply and divide same number in fraction than this will not affect our results.
25)	**Option A. Any integer**
26)	**Option D.** $\frac{\text{constant term}}{\text{coefficient of } x^2}$
27)	**Option A.**
28)	**Option C.**
29)	Option A. number of columns in A= number of rows in B Explanation: A=$\begin{bmatrix}-1 & 5\\ 2 & 3\end{bmatrix}$, B=$\begin{bmatrix}1\\ 2\end{bmatrix}$, C=$\begin{bmatrix}3\\ 7\end{bmatrix}$ AB is conformable because number of columns in A= number of rows in B But BC is not conformable because number of columns in B≠number of rows in C
30)	Option (d) Non Explanation: Because number of columns in B≠number of rows in A So multiplication is not conformable
31)	Option (c) One of A or B is identity matrix Explanation: A=$\begin{bmatrix}-4 & 7\\ 2 & 3\end{bmatrix}$, and B= $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$(identity matrix)

	AB=BA can easily be verified
32)	Option (d) $k^3 \lvert A \rvert$ Explanatiom Let A=, $\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$ is a matrix of order 3 $\lvert kA \rvert = \begin{bmatrix} ka_{11} & ka_{12} & ka_{13} \\ ka_{21} & ka_{22} & ka_{23} \\ ka_{31} & ka_{32} & ka_{33} \end{bmatrix} = k.k.k \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} = k^3 \lvert A \rvert$
33)	**Option A.** 2^{2n}
34)	**Option C.** $\left(\frac{n+1}{2}\right) th\ and \left(\frac{n+3}{2}\right) th\ term$
35)	**Option A.** $9/2\pi$ **Explanation:** r=18 $\theta = 45$ $\theta = 45\left(\frac{\pi}{180}\right) = \frac{9\pi}{36}$ $l = r\theta = 18\left(\frac{9\pi}{36}\right) = \frac{9\pi}{2}$
36)	**Option A.** $1/2r^2\theta$
37)	**Option (a)B^tA^t** Explanation: for example A=$\begin{bmatrix} -1 & 5 \\ 2 & 3 \end{bmatrix}$ and B=$\begin{bmatrix} -4 & 7 \\ 2 & 3 \end{bmatrix}$ $A^t = \begin{bmatrix} -1 & 2 \\ 5 & 3 \end{bmatrix}$ and $B^t = \begin{bmatrix} -4 & 2 \\ 7 & 3 \end{bmatrix}$ $(AB)^t = B^t A^t$ can be verified easily
38)	**Option B. Series** Explanation:The sum of an indicated number of terms in a sequence is called a series. For example, the sum of the first seven terms of the sequence $\{n^2\}$ is the series, 1 + 4 + 9 + 16 + 25 + 36 + 49.
39)	**Option B. 1+4+9+16**

	Explanation: $\{n^2\}=1^2+2^2+3^2+4^2=1+4+9+16$ The series upto 4 terms is called fourth partial sum of$\{n^2\}$ Because variable in this polynomial have maximum power 2
40)	**Option A.** $\frac{n}{2}[2a+(n-1)d]$ Explanation: By series Sum formula for finite series is $s_n=\frac{n}{2}[2a+(n-1)d]$
41)	**Option B.** T_8 Explanation: $n = 14$ n is even so $\left(\frac{n}{2}+1\right)=\left(\frac{14}{2}+1\right)=8th$
42)	**Option A.** $\binom{13}{5}a^8x^5$
43)	**Option D:** $-\frac{1}{\sqrt{3}}$ **EXPLANATION:** Tan (sin^{-1}(-1/2)) = $-\frac{1}{\sqrt{3}}$ as $\sin-1\left(-\frac{1}{2}\right) = -30°$
44)	**Option A:** Sin^{-1}(A$\sqrt{1-B^2}$+B$\sqrt{1-A^2}$) **Explanation:** By Fomula, sin^{-1} A+sin^{-1} B = Sin^{-1}(A$\sqrt{1-B^2}$+B$\sqrt{1-A^2}$)
45)	**Option A:** $\left\{\frac{\pi}{4}+n\pi,\ \frac{5\pi}{4}+n\pi\right\}$ (Trick: value 1 is get on the angle of $\frac{\pi}{4},\frac{5\pi}{4}$ and tan interval is $n\pi$)
46)	**Option A:** $\frac{\pi}{8}$

	(Trick: -1 is get on the angle of $\frac{\pi}{8}$)
47)	**Option a. undefined** **Explanation:** $= \lim_{x \to a} \frac{x^3 - a^3}{x - a}$ $= \frac{a^3 - a^3}{a - a}$ $= \frac{0}{0}$ Hence undefined
48)	**Option A. 1** Explanation: $(sec\,\theta + tan\,\theta)(sec\,\theta - tan\,\theta) = sec^2\,\theta - tan^2\,\theta = 1$
49)	**Option D. 270** Explanation as it lies in the third quadrant where x is +ve and y is -ve
50)	**Option d** $\boldsymbol{na(ax+b)^{n-1}}$ **Explanation:** $\frac{d}{ax}(ax+b)^n = n(ax+b)^{n-1}\left[\frac{d}{dx}(ax+b)\right]$ $na(ax+b)^{n-1}$
51)	**Option b: 54.6 x 10^{-8}m** **Explanation:** 546 nm= 546 x 10^{-9} = 54.6 x 10^{-8}m
52)	**Option b: 5732°** **Explanation:** 100rad X 180/ π

	= 5729.58
53)	**Option b: Right hand rule** **Explanation:** Because the direction of vector product is given by right hand rule that is the direction of the product vector is perpendicular to this plane. Rotate the first vector A into B through the smaller of the two possible angles and curl the fingers to the right hand. In the direction of rotation, keeping the thumb erect. The direction of the product vector will be along the erect thumb.
54)	**Option b: 54.6×10^{-8}m** **Explanation:** 546 nm= 546×10^{-9} = 54.6×10^{-8}m
55)	**Option b: 5732°** **Explanation:** 100rad X 180/ π = 5729.58
56)	**Option a: giga** **Explanation:** Giga = 10^9 Mega = 10^6 Kilo = 10^3 Deca = 10^1 So giga is the highest power multiple.
57)	**Option (d)**The ratio of the force applied to the machine to the force exerted by it **Explanation:** Mechanical advantage is the ratio of the output force to the input force, so it can be represented by the equation: Note that this equation represents the actual mechanical advantage of a machine. The actual mechanical advantage takes into account the amount of the input force that is used to overcome friction.

58)	**Option d: 20 J** **Explanation:** W = Fd = 4 x 5 = 20 J
59)	**Option a:** ***(Kgm_2)*** Explanation: The amount of torque needed to cause any given angular acceleration (the rate of change in angular velocity) is proportional to the **moment of inertia** of the body. **Moment of inertia** may be **expressed** in units of kilogram meter squared (kg. m^2) in SI units and pound-foot-second squared (lbf. ... s^2) in imperial or US units.
60)	**Option d: ($r \times p$)** Explanation: **Angular Momentum** for a Single Particle. ... Notice that this equation is equivalent to $l = \mathbf{rp} \sin\theta$, where **p** is the linear **momentum** of the particle: a particle does not need to move in a circular path to possess **angular momentum**.
61)	**Option b: 2s** **Explanation:** $V_f = V_i + gt$ $0 = 19.6 - 9.8t$ $t = 19.6/9.8$ $t = 2s$
62)	**Option d: 40° and 50°** **Explanation:** Range = $V_i^2/g \sin 2\theta$
63)	**Option b: are inertial**

	Explanation: Frame of reference in which newton's law of motion hold is known as inertial frame of reference.
64)	**Option d: distance covered**
65)	**Option a: 0.61 ms^{-1}**
66)	**Option c: elasticity** **Explanation:** The distances between molecules in solids are very small, i.e., solids are more dense - as compared to liquids and gases. Because they are so close, than can collide very quickly, i.e. it takes less time for a molecule of the solid to 'bump' into its neighbor. Solids are packed together tighter than liquids and gases, hence sound travels fastest in solids. The distances in liquids are shorter than in gases, but longer than in solids. Liquids are more dense than gases, but less dense than solids, so sound travels 2nd fast in liquids. Gases are the slowest because they are the least dense: the molecules in gases are very far apart, compared with solids and liquids.
67)	**Option b: $\lambda/2$** **Explanation:** When a wave enters a different medium, its wavelength and speed change, but its frequency remains the same. ... From a crest to a trough is a distance of $\lambda/2$. A change of phase of 180° or π is equivalent to a path difference of $\lambda/2$.
68)	**Option d: 4.2×10^5 J** **Explanation:** $A = 0.2 + \mu g$ $= 0.6\,g$ $W = f \times d = mas$ $= (6000/9.8) \times 0.69 \times 1000$ $= \mathbf{4.2 \times 10^5\ J}$
69)	**Option c: 10 J** **Explanation:** $W = 1 \times 1 \times 9.8$ $W = 9.8 \approx 10$ J

70)	**Option b: 47 J** **Explanation:** **W = f – d** **D= 2πr** **= 15.708m** **W = 3 x 15.708** **W = 475**
71)	**Option c : 140 J** **Explanation:** W = fdcosθ W = 40 + (80 / 9.8) x (-1.5) W = 140 J
72)	**Option d: fo-fe** **Explanation:** ASTRONOMICAL TELESCOPE-MAGNIFYING POWER. It is an optical instrument used to view heavenly bodies such as moon stars, planets and distant object. The objective is a convex lens of large focal length and large aperture
73)	**Option a: fo+fe** **Explanation:** .An astronomical telescope works on the principle that when an object to be mag. ... and an eye piece E. the focal length fo of the objective lens of astronomical telescope is ... whose position is adjusted so that the image lies between the focus *fe*'.
74)	**Option c: Greater than critical angel** **Explanation:** Total internal reflection is a phenomenon that occurs at the boundary between two mediums, such that if the incident angle in the first medium is greater than the critical angle, then all the light is reflected back into that medium.
75)	**Option B. (Light from sodium lamp)** **Explanation:**

	A sodium-vapor lamp is a gas-discharge lamp that uses sodium in an excited state to produce light at a characteristic wavelength near 589 nm. ... Low-pressure sodium lamps only give monochromatic yellow light and so inhibit color vision at night.
76)	**Option C. (Same wave length with constant phase difference)** **Explanation:** The source of light, which emit continuous light waves of same wavelength, same frequency and in same phase or having a constant phase difference are called coherent sources. Two coherent lights form a consistent image.
77)	**Option b : (Yellow light)** **Explanation:** When you burned the skewer tip coated with sodium chloride, you should have seen that the flame on the sodium chloride was pure yellow/orange (without any blue). This is because when the metal sodium is heated, it makes intense yellow/orange light.
78)	**Option b. (Consecutive Interference)** **Explanation:** When two waves meet in such a way that their crests line up together, then it's called constructive interference. The resulting wave has a higher amplitude. In destructive interference, the crest of one wave meets the trough of another, and the result is a lower total amplitude
79)	**Option B. (Light from sodium lamp)** **Explanation:** A sodium-vapor lamp is a gas-discharge lamp that uses sodium in an excited state to produce light at a characteristic wavelength near 589 nm. ... Low-pressure sodium lamps only give monochromatic yellow light and so inhibit color vision at night.
80)	**Option c: one forth** **Explanation:** If radius becomes half then $r' = r/2$ New $Vt'=?$ $Vt'/Vt = r'>2/r>2$ By plugging in the value of r' in the above relation. $Vt'/Vt = (r/2)>2/r>2$

	$V_t'/V_t = 1/4$ $V_t' = V_t/4$
81)	**Option b: Calcium state**
82)	**Option c: $2Ca+CO_2 \rightarrow 2CaO+C$**
83)	**Option c: Moving mercury**
84)	**Option a: $CaOCl_2$** **Explanation:** 1. It is used as bleaching agent in textile industry. 2. It is used in the purification of drinking water.
85)	**Option d: Red** **Explanation:** The flame test is a fun and useful analytical technique to help you identify the chemical composition of a sample based on the way it changes the color of a flame. However, interpreting your results can be tricky if you don't have a reference. There are many shades of green, red, and blue, usually described with color names you wouldn't find on even a large crayon box! The flame test color for strontium is the red of emergency flares and red fireworks. It's a deep crimson to brick red.
86)	**Option c** **Explanation:** Because it is inversely proportional to atomic size and shielding effect. As the atomic size and shielding effect increase down the group, there will be small attraction between electron and nucleus due to large distance.
87)	**Option a** **Explanation:** Orthoboric acid is a colorless solid. It is slightly soluble in water and its solubility at 100 centigrade is 34 gm/100 gm of H20.
88)	**Option b** **Explanation:** Generally carbon compounds do not conduct electricity because they do notcontain free electrons because carbon is capable of forming many allotropes due to its valency. Well-known forms of carbon include diamond and graphite.

89)	**Option b** **Explanation:** Dinitrogentetraoxide (N_2O_4) has a very weak N-N bond and is in equilibrium with NO_2. It is a diamagnetic substance. It reacts with water to form nitrous and nitric acids and it oxidizes many metals.
90)	**Option a** **Explanation:** The conjugate acid of the phosphite anion is phosphorous acid (H3PO3). Other names for this acid are orthophosphorous acid and dihydroxyphosphine oxide. PHOSPHOROUS ACID is a white or yellow crystalline solid (melting point 70.1 deg C) or a solution of the solid. Orthophosphoric acid is a tribasic acid. It has three ionisable hydrogen atoms. Hence, it is a tribasic acid.
91)	**Option a** **Explanation:** Bond strength decreases with increase in the size of halogen.
92)	**Option a** **Explanation:** Iodine is usually used in an alcohol solution (called tincture of iodine) or as Lugol's iodine solution as a pre- and postoperative antiseptic. Some people do not recommend disinfecting minor wounds with iodine because of concern that it may induce scar tissue formation and increase healing time. However, concentrations of 1% iodine or less have not been shown to increase healing time and are not otherwise distinguishable from treatment with saline. Novel iodine antiseptics containing povidone-iodine (an iodophor, complex of povidone, a water-soluble polymer, with triiodide anions I3-, containing about 10% of active iodine) are far better tolerated, do not negatively affect wound healing, and leave a deposit of active iodine, thereby creating the so-called "remnant", or persistent, effect. The great advantage of iodine antiseptics is their wide scope of antimicrobial activity, killing all principal pathogens and, given enough time, even spores, which are considered to be the most difficult form of microorganisms to be inactivated by disinfectants and antiseptics.
93)	**Option c**

	Explanation: SF_3CL_3 is similar to SF_6 thus octahedral
94)	**Option c** **Explanation:** The lone pairs on the two nitrogen atoms can form coordinate bonds with a metal or metal ion.
95)	**Option b** **Explanation:** Phenanthrene is a polycyclic aromatic hydrocarbon composed of three fused benzene rings. The name 'phenanthrene' is a composite of phenyl and anthracene. In its pure form, it is found in cigarette smoke and is a known irritant, photosensitizing skin to light.
96)	**Option b** **Explanation:** **Aniline** is an organic compound with the formula $C_6H_5NH_2$. Consisting of a phenyl group attached to an amino group, **aniline** is the prototypical aromatic amine. Its main use is in the manufacture of precursors to polyurethane and other industrial chemicals. Like most volatile amines, it has the odor of rotten fish.
97)	**Option b** 10 **Explanation:** Arenes are insoluble in water and hence they are non-polar compounds.
98)	Option b Explanation: Hydration of alkene is electrophilic addition of H_2O to alkenes which forms alcohol not alkyl halides.
99)	**Option a**
100)	**Option a**

Section (I): English (Questions 1–20)

*In Paper, This section will contain 10 MCQ's, We have added 10 extra mcqs for your practice.

Read the following passage and answer the questions given at the end.

In the 16th century, an age of great marine and terrestrial exploration, Ferdinand Magellan led the first expedition to sail around the world. As a young Portuguese noble, he served the king of Portugal, but he became involved in the quagmire of political intrigue at court and lost the king's favor. After he was dismissed from service by the king of Portugal, he offered to serve the future Emperor Charles V of Spain.

A papal decree of 1493 had assigned all land in the New World west of 50 degrees W longitude to Spain and all the land east of that line to Portugal. Magellan offered to prove that the East Indies fell under Spanish authority. On September 20, 1519, Magellan set sail from Spain with five ships. More than a year later, one of these ships was exploring the topography of South America in search of a water route across the continent. This ship sank, but the remaining four ships searched along the southern peninsula of South America.

Finally they found the passage they sought near 50 degrees S latitude. Magellan named this passage the Strait of All Saints, but today it is known as the Strait of Magellan.

One ship deserted while in this passage and returned to Spain, so fewer sailors were privileged to gaze at that first panorama of the Pacific Ocean. Those who remained crossed the meridian now known as the International Date Line in the early spring of 1521 after 98 days on the Pacific Ocean. During those long days at sea, many of Magellan's men died of starvation and disease.

Later, Magellan became involved in an insular conflict in the Philippines and was killed in a tribal battle. Only one ship and 17 sailors under the command of the Basque navigator Elcano survived to complete the westward journey to Spain and thus prove once and for all that the world is round, with no precipice at the edge.

Question 1. The 16th century was an age of great ______ exploration.

a. cosmic
b. land
c. mental
d. common man
[✓ None of the above]

Question 2. Magellan lost the favor of the king of Portugal when he became involved in a political ________.

a. entanglement
b. discussion
c. negotiation
d. problem
[✓ **e.** None of the above]

Question 3. The Pope divided New World lands between Spain and Portugal according to their location on one side or the other of an imaginary geographical line 50 degrees west of Greenwich that extends in a _________ direction.

a. north and south
b. crosswise
[✓ **c.** easterly]

d. south east

e. north and west

Question 4. One of Magellan's ships explored the _________ of South America for a passage across the continent.

a. coastline
b. mountain range
c. physical features
d. islands
[✓ **e.** None of the above]

Question 5. Four of the ships sought a passage along a southern ______.

a. coast
b. inland
c. body of land with water on three sides
d. border
[✓ **e.** Answer not available]

Question 6. Parts of seventeenth-century Chinese pleasure gardens were not necessarily intended to look_____they were designed expressly to evoke the agreeable melancholy resulting from a sense of the _____ of natural beauty and human glory.

a. great - immutability
b. joyful - mortality
c. conventional - wildness
[✓ d. cheerful – transitoriness]

Question 7. The Neolatonists' conception of a deity, in which perfection was measured by abundant fecundity, was contradicted by that of the Aristotelians, in which perfection was displayed in the ____ of creation.

a. variety
[✓ b. economy]
c. profusion
d. clarity

Question 8. Human reaction to the realm of though is often as strong as that to sensible presences; our higher moral life is based on the fact that _____ sensations actually present may have a weaker influence on our action than do ideas of ___facts.

a. emotional - impersonal
b. familiar : symbolic
c. disturbing – ordinary
[✓ d. material – remote]

Question 9. Ecology, like economics, concerns itself with the movement of valuable ____ through a complex network of producers and consumers.

a. nutrients
b. dividends
[✓ c. communications]
d. artifacts

Question 10. In his usual _____ manner, he had insured himself against this type of loss.

a. pensive
b. providential

c. indifferent
[✓ d. circumspect]

Write antonyms of the following:

Question 11. SCURRILOUS:
[✓ a. Decent]
b. savage
c. major
d. volatile

Question 12. TOUT
a. cast aspersions on
b. deny the relevance of
[✓ c. misrepresent]
d. withhold consent

Question 13. SCOTCH
a. renovate
b. entrust
c. unfasten
[✓ d. encourage]

Question 14. IGNOMINIOUS:
A. scholarly
[✓ B. incognito]
C. laudatory
D. disgraceful

Question 15. PALTRY :
[✓ A. farm]
B. scanty
C. excessive
D. friendly

Choose the correct Analogies.

Question 16. CONFIRMED: INVETERATE
A. knowledge : supposed
[✓ B. financial : bankrupt]
C. immature : callow
D. credible : incredible

Question 17. DORY: VAN
A. dairy : cow
B. fish : vehicle
[✓ C. freighter : caisson]
D. runners : wheels

Question 18. PARENTHESIS: EXPLANATION
[✓ A. ellipsis : omission]
B. asterisk : exaggeration
C. synopsis : affectation
D. apostrophe : annotation

Question 19. SAND PAPER: ABRASIVE
A. gasoline : refined
B. grativity : irritant
C. polish : floors
[✓ D. oil : lubricant]

Question 20. RIG: CONTEST

- **A.** solve : conundrum
- **B.** predict : race
- **C.** repudiate : thesis
- [✓ **D.**] gerrymander : district

Section (II): Mathematics (Questions 21-50)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practice.

Question 21. For a, b c $\in$ r if $a > b$ and $c < 0$, then

(a) $a+b<b+c$ (b) $ac > bc$ [✓ (c)] $ac < bc$ (d) $a-b<0$

Question 22. The set {1, -1} is closed w. R. T

(a) addition. [✓ (b)] multiplication (c) subtraction (d) none

Question 23. The set {1} has closure property w. R. T

(a) addition (b) subtraction n [✓ (c)] division (d) none

Question 24. If z1 and z2 are any. Two complex number, then

(a) $|z1+z2|<|z1|+|z2|$ [✓ (b)] $|z1+z2|\leq|z1|+|z2|$

(c) $|z1-z2|<|z1|+|z2|$ (c) $|z1+z2|\geq|z1|+|z2|$

Question 25. 5.333......is

[✓ (a)] rational (b) irrational . (c) an integer (d) a prime integer

Question 26. (22/7) is a

[✓ (a)] rational (b) irrational (c) an integer (d) a whole number

Question 27. If n is a negative number, then $\sqrt{n}$ is

(a) a rational number (b)an irrational number

(c) only negative integer [✓ (d)] a pure Imaginary

Question 28. The number of partial fraction of $\frac{x^3}{x(x+1)(x^2 \_ 1)}$ are

a. 2
b. 3
[✓ c.] 4
d. None

Question 29. Two matrix A and B are conformable for multiplication AB if

[✓ a)] number of columns in A= number of rows in B
b) number of rows in B = number of columns in A
c) number of rows in A= number of rows in B
d) number of columns in A = number of columns in B

Question 30. If A is of Order 2×3 and B of order 4x2 , then order of BA

(a) 2x2 (b) 3×4 (c)4×3 [✓ (d)] Non

Question 31. If α and β are roots of $3x^2-2x+4=0$ then value of $\alpha+\beta$

[✓ a)] $^2/_3$
b) $-^2/_3$
c) $^4/_3$
d) $-^4/_3$

Question 32. If p and q are roots of $8x^2-3x-16=0$ then pq is equal to

[✓ a)] 2
b) -2
c) p+q
d) none

Question 33. The roots of $ax^2+bx+c=0$ are imaginary if

a) $b^2-4ac>0$
[✓ b)] $b^2-4ac<0$
c) $b^2-4ac=0$
d) $b^2-4ac\neq 0$

Question 34. If n is odd then middle term/s is $(a+x)^n$ is/are

a. $\left(\frac{n+1}{2}\right)th\ term$
b. $\left(\frac{n}{2}+1\right)th\ term$
[✓ c.] $\left(\frac{n+1}{2}\right)th\ and\ \left(\frac{n+3}{2}\right)th\ term$
d. $\left(\frac{n}{2}+1\right)th\ and\ \left(\frac{n}{2}+2\right)th\ term$

Question 35. If $\theta=45^0$, r=18mm then l is equal to

[✓ a.] 9/2π
b. 2/9π
c. 810
d. 810mm

Question 36. Which one is proper fraction

a. $\frac{x}{2x-3}$
[✓ b.] $\frac{(x-2)(x+1)}{(x-1)(x+4)}$
c. $\frac{x^2-3}{3x+1}$
d. $\frac{9x^2}{x^3-1}$

Question 37. Which one is improper fraction

a. $\frac{3}{x+1}$
b. $\frac{2x-5}{x^2+4}$
c. $\frac{9x^2}{x^3-1}$
[✓ d.] $\frac{(x-2)(x+1)}{(x-1)(x+4)}$

Question 38. The proper fraction of $\frac{2x^3+x^2-x-3}{x(2x+3)(x-1)}$ is

a. $1+\frac{2x-3}{x(2x+3)(x-1)}$
b. $2+\frac{2x-3}{x(2x+3)(x-1)}$
c. $3+\frac{2x-3}{x(2x+3)(x-1)}$
[✓ d.] $0+\frac{2x-3}{x(2x+3)(x-1)}$

Question 39. Fourth partial sum of the sequence $\{n^2\}$ is

a) 16
[✓ b)] 1+4+9+16
c) 8
d) 1+2+3+4

Question 40. Sum of n terms of an arithmetic series S_n is equal to

[✓ a)] $\frac{n}{2}[2a+(n-1)d]$
b) $\frac{n}{2}[a+(n-1)d]$
c) $\frac{n}{2}[2a+(n+1)d]$
d) $\frac{n}{2}(2a+l)$

Question 41. Nonoccurrence of an event is denoted by

a. E
[✓ b.] $\bar{E}$
c. E_c
d. All of these

Question 42. If E be an event of sample space S, then

a. $P(E)=1+P(\bar{E})$
b. $P(\bar{E})=1+P(E)$
[✓ c.] $P(E)=1-P(\bar{E})$
d. $P(\bar{E})=1-P(E)$

Question 43. Let S={1,2,3…..10} the probability that a number divisible by 4 is

a. $\frac{2}{5}$
[✓ b.] $\frac{1}{5}$
c. $\frac{1}{10}$
d. $\frac{1}{2}$

estion 44. $\sin^{-1} A + \sin^{-1} B$ is equal to

[✓ a. $\sin^{-1}(A\sqrt{1-B^2}+B\sqrt{1-A^2})$]
b. $\sin^{-1}(A\sqrt{1-B^2}-B\sqrt{1-A^2})$
c. $\sin^{-1}(B\sqrt{1-A^2}-A\sqrt{1-B^2})$
d. $\sin^{-1}(AB\sqrt{(1-A^2)(1-B^2)})$

Question 45. General solution of $tanx = 1$ is:

[✓ a. $\left\{\frac{\pi}{4}+n\pi,\ \frac{5\pi}{4}+n\pi\right\}$]
b. $\left\{\frac{\pi}{4}+2n\pi,\ \frac{5\pi}{4}+2n\pi\right\}$
c. $\left\{\frac{\pi}{4}+n\pi,\ \frac{3\pi}{4}+n\pi\right\}$
d. $\left\{\frac{\pi}{4}+2n\pi,\ \frac{3\pi}{4}+2n\pi\right\}, n\epsilon Z$

Question 46. If $tan2x = -1$, then solution in the interval $[0,\pi]$ is:

[✓ a. $\frac{\pi}{8}$]
b. $\frac{\pi}{4}$
c. $\frac{3\pi}{8}$
d. $\frac{3\pi}{4}$

Question 47. $\lim\limits_{x\to a}\frac{x^3-a^3}{x-a}$=?

[✓ a. Undefined]
b. $3a^2$
c. a^2
d. 0

Question 48. If angle θ is in degree, then the angle conterminal with θ is

(a) $\theta + 180^0 k,\ k \in Z$
[✓ (b) $\theta + 360^0\ k,\ k \in Z$]
(c) $\theta + 90^0 k,\ k$
(d) None of these

Question 49. $\text{cosec}^2\,\theta$ - $\cot^2\theta$ is equal to

a. 0
[✓ b. 1]
c. -1
d. 2

Question 50. If cot θ> 0 & cosec θ> 0, then the terminal arm of angle lies in ... Quad

[✓ a. I]
b. II
c. III

d. IV

Section (III):Physics (Questions 51-80)

*In Paper, This section will contain 20 MCQ's, We have added 10 extra mcqs for your practi

Question 51. If the wavelength of green line of the visible spectrum is 546 nm, what is its value in meters?

a) 54.6×10^{9} m
[✓ b) 54.6×10^{-8} m]
c) 546×10^{-19} m
d) 546×10−10 m

Question 52. "100 radians" are equal to how much degrees?

(a) 57.3°
[✓ b) 5732°]
c) 573°
d) 5.73°

Question 53. The direction of vector product is given by:

(a) Head to tail rule
[✓ b) right hand rule]
c) Left hand rule
d) triangle rule

Question 54. If the wavelength of green line of the visible spectrum is 546 nm, what is its value in meters?

a) 54.6×10^{9} m
[✓ b) 54.6×10^{-8} m]
c) 546×10^{-19} m
d) 546×10−10 m

Question 55. " Which one is derived unit?

a) Candela
b) Ampere
[✓ d) Coulomb]
d) Mole

Question 56. Silicon is abundantly obtained from:

a) Water
b) Metal
[✓ c) Sand]
d) Stones

Question 57. Total number of base units are:

a) 3
b) 5
[✓ c) 7]
d) 9

Question 58. The SI unit of plane angle is:

a) Steradian
[✓ b) radian]
c) degree
d) candela

Question 59. Moment of inertia is measured in:

[✓ a) $kgm2$]
b) $kgm-2$
c) Ns
d) rad/s

Question 60. The angular momentum is given by:

a) mω
b) ω × F
c) r × F
[✓ d) r × p]

Question 61. A ball thrown up with a velocity of $19.6ms^{-1}$ return back to its thrower's hand after

a) 1s
[✓ b) 2s]
c) 3s
d) 4s

Question 62. A body thrown up with a velocity of 9.8 ms^{-1} reaches a maximum height of:

a) 9.8m
[✓ b) 4.9m]
c) 19.6m
d) 44.1m

Question 63. A force of 4N acting on a body of mass 2 kg for 2s produces a rate change of momentum of:

a) 1 gms^{-1}
b) 2 $kgms^{-1}$
[✓ c) 4$kgms^{-1}$]
d) 8$kgms^{-1}$

Question 64. Speed of projectile is minimum at the:

a) Point of landing
b) point of projection
[✓ c) Maximum height]
d) none of these

Question 65. With the help of velocity-time graph, we can find:

[✓ a) Distance]
b) Time
c) Velocity
d) Momentum

Question 66. The speed of sound is greater in solids than in gases due to high value of:

a) Density b) Pressure [✓ c) Elasticity] d) Temperature

Question 67. Phase difference of 180° is equivalent to a path difference of:

a)λ [✓ b)$\lambda/2$] c)$\lambda/4$ d)$\lambda/8$

Question 68. Camping equipment weighing 6000N is pulled across a frozen lake by means of a horizontal rope. The co efficient of kinetic friction is 0.05. How much work is done by the campers in pulling the equipment 1000m if its speed is increasing at the constant rate of 0.20m/s2?

a) −1.2×106 J b) 1.8×105 J c) 3.0×105 J [✓ d) 4.2×105 J]

Question 69. A 2-kg object is moving at 3m/s. A 4-N force is applied in the direction of motion and then removed after the object has travelled an additional 5m.

The work done by this force is:

a) 12J b) 15J c) 18J [✓ d) 20J]

Question 70. A sledge (including load) weighs 5000N. It is pulled on level snow by a dog team exerting a horizontal force on it. The co efficient of kinetic friction between sledge and snow is 0.05. How much work is done by the dog team pulling the sledge 1000m at constant speed?

a) 2.5×104 J [✓ b) 2.5×105 J] c) 5.0×105 J d) 2.5×106 J

Question 71. Camping equipment weighing 6000N is pulled across a frozen lake by means of a horizontal rope. The co efficient of kinetic friction is 0.05. The work done by the campers in pulling the equipment 1000m at constant velocity is:

a) 3.1×104 J b) 1.5×105 J [✓ c) 3.0×105 J] d)2.9×106 J

Question 72. Camping equipment weighing 6000N is pulled across a frozen lake by means of a horizontal rope. The co efficient of kinetic friction is 0.05. How much work is done by the campers in pulling the equipment 1000m if its speed is increasing at the constant rate of 0.20m/s2?

a) −1.2×106 J b) 1.8×105 J c) 3.0×105 J [✓ d) 4.2×105 J]

Question 73. For normal adjustment, the length of astronomical telescope is:

[✓ a) $f0 + fe$] b) $f0 - fe$ c) $f0fe$ d) $f0fe$

Question 74. For the phenomenon of total internal reflection, the angle of incidence should be:

a) Equal to critical angle
b) Smaller than critical angle
[✓ c) Greater than critical angle]
d) Zero

Question 75. Which one of the following is nearly monochromatic light?

a) Light form fluorescent tube
[✓ b) Light form sodium lamp]
c) Light form neon lamp
d) Light form simple lamp

Question 76. Two sources of light are coherent if they emit rays of:

a) same wavelength
b) Same amplitude of vibration
[✓ c) Same wave length with constant phase difference]
d) Same amplitude and wavelength

Question 77. Sodium chloride in a flame gives out pure:

a) Blue light [✓ b) Yellow light] c) Red light d) White light

Question 78. When crest of one wave falls over the trough of the other wave, this phenomenon is known as:

a) Polarization [✓ b) Constructive interference]

c) Destructive interference d) Diffraction

Question 79. The bending of beam of light when it pass from one medium to another is known as:

a) Refraction [✓ b) Reflection] c) Diffraction d) Dispersion

Question 80. If radius of droplet becomes half then its terminal velocity will be:

a) Half b) Double [✓ c) One forth] d) Four times

Section (IV): Chemistry (Questions 81-100)

==> THIS SECTION IS ONLY FOR CANDIDATES APPLYING IN MS CHEMISTRY

Question 81. Soap secum is often composed of

a. Magnesium
[✓ b. Calcium state]
c. Aluminum
d. Strontium chloride

Question 82. Which of the following equations is not actually observed?

a. $2Mg+CO_2 \rightarrow 2MgO+C$
b. $2Mg+SO_2 \rightarrow 2MgO+S$
[✓ c. $2Ca+CO_2 \rightarrow 2CaO+C$]
d. All of them

Question 83. Melting and boiling points of Alkaline earth metals are _______ than those of alkali metals.

[✓ a) Higher]
b) Lower
c) Both a and b
d) None of them

Question 84. The oxide of beryllium are

e) Basicity
f) Rancidity
[✓ g) Amphoteric]
h) None of all

Question 85. Slacked lime is

[✓ i) $Ca(OH)_2$]
j) KNO_2
k) KNO_3
l) None of them

Question 86. Electron negativity decreases down the group in all the p block elements excepts

a) I-A
b) III-B
[✓ c) III-A]
d) III-C

Question 87. Orthoboric acid is obtained from the following

[✓ a.] $Na_2B_4O_9 + 3HCL + 5H_2O \rightarrow 4H_5BO_3 + 2NACl$

b. $Na_2B_4O_7 + 2HCL + 5H_2O \rightarrow 7H_3BO_3 + 2NACl$

c. $Na_2B_4O_7 + 2HCL + 5H_2O \rightarrow 4H_3BO_3 + 3NACl$

d. $Na_2B_4O_7 + 2HCL + 5H_2O \rightarrow 4H_3BO + 2\ NACl$

Question 88. Diamond form of Carbon do not conduct electricity due to absence of

a. Spectators electrons

[✓ b.] Delocalized electrons

c. Free electrons

d. Ions

Question 89. Which of the following is a characteristic of crystalline structure?

e) High density

f) Low density

g) Range of melting point

[✓ h)] Varying structure

Question 90. Magnesium Silicate, Mg3H2(SiO3)4 is commonly called as

[✓ i)] Talc

j) Soap stone

k) None of them

l) Both a and b

Question 91. Which of the following sets gives the correct arrangement of the compounds involved based on their bond strengths?

[✓ a)] HF>HCl>HBR>HI

b)HF > HCl > HI > HBR

c)HF > HI > HCl > HBR

d)HCl > HF > HI > HBR

Question 92. Which of the following is antiseptic?

[✓ b)] I

b)Br

c)Cl

d)F

Question 93. All the elements of oxygen family are

a) Non metals

b)Metals

[✓ c)] Polymorphic

d)None of them

Question 94. The geometry of H_2S and its dipole moment are

b) Angular and zero

[✓ **b)**] Angular and non-zero

c)Linear and zero

d)Linear and non-zero

Question 95. By passing H2S gas in acidified KMnO4 solution, we get

c) K_2S

[✓ **b)**] S

c)K_2SO_3

d)MnO_2

Question 96. When sulphur is boiled with Na2SO3 solution, the compound formed is

d) Sodium sulphide

b)Sodium thiosulphide

[✓ c)] Sodium thiosulphate

d)None of them

Question 97. Phenanthrene is a fused polycyclic compound contains ______ benzene rings

a. Two

[✓ b.] Three

c. Four

d. Five

Question 98. Aniline is a derivative of benzene which contains

a. Imino group

[✓ b. Amino group]

c. Both a and b

d. Neither a nor b

Question 99. Which of the foll‿wing is not the method of preparation of alkyl halide?

[✓ (a) Darzen's method]

[✓ (b) Hydration of alkene]

(c) Both a and b

Question 100. CH_3CHO and $C_6H_5CH_2CHO$ can be distinguished chemically by

[✓ a. Iodoform test]

b. Fehling solution test

c. Both a and b

d. Neither a nor b

1)	E **MARINE AND TERRESTIAL**
2)	E QUAGMIRE
3)	C
4)	E TOPOGRQAPHY
5)	E
6)	D
7)	B
8)	D
9)	**C**
10)	**D**
11)	A
12)	C
13)	D
14)	B
15)	A
16)	B
17)	C
18)	A

19)	D
20)	D
21)	Option C. ac < bc Explanation: One of the properties from the multiplicative properties of the inequalities of the real numbers.
22)	**Option B. Multiplication.** **Explanation:** This is according to the closure property of the multiplication. because in this set closure property only holds for multiplication. For example 1*1=1 1*(-1)= -1 -1 * -1= 1
23)	**Option C. Division** **Explanation:** According to the closure property of division. because in this set closure property holds for division. 1/1= 1
24)	**Option B.** **Explanation:** B is correct according to the "analogue of the triangular inequality". Which states that the modulus of the sum of two complex numbers is less than or equal to the sum of the moduli of the numbers.
25)	**Option A. Rational number.**
26)	**Option A. A rational number**
27)	**Option D. A pure imaginary number** **Explanation:** $\sqrt{-n}$ does not belong to real numbers. Therefore, for convenience we call it Imaginary number and denotes it with i $\sqrt{(-n)}=\sqrt{n}\,\sqrt{(-1)}=\sqrt{n}\,i$
28)	**Option C.**

29)	Option A. number of columns in A= number of rows in B Explanation: A=$\begin{bmatrix}-1 & 5\\ 2 & 3\end{bmatrix}$, B=$\begin{bmatrix}1\\ 2\end{bmatrix}$, C=$\begin{bmatrix}3\\ 7\end{bmatrix}$ AB is conformable because number of columns in A= number of rows in B But BC is not conformable because number of columns in B≠number of rows in C
30)	Option (d) Non Explanation: Because number of columns in B≠number of rows in A So multiplication is not conformable
31)	**Option A. 7** **Explanation :** $\frac{constant\ term}{coefficient\ of\ x^2}$=1 so q/7=1 => q=7
32)	**Option A. 2/3** **Explanation:** $-\frac{coefficient\ of\ x}{coefficient\ of\ x^2}$=-(-2)/3=2/3
33)	**Option B. -2** **Explanation:** $\frac{constant\ term}{coefficient\ of\ x^2} = -\frac{16}{2} = -2$
34)	**Option C.** $\left(\frac{n+1}{2}\right) \boldsymbol{th\ and} \left(\frac{n+3}{2}\right) \boldsymbol{th\ term}$
35)	**Option A. 9/2π** **Explanation:** r=18 $\theta = 45$ $\theta = 45\left(\frac{\pi}{180}\right) = \frac{9\pi}{36}$

	$l = r\theta = 18\left(\frac{9\pi}{36}\right) = \frac{9\pi}{2}$
36)	**Option b.** **Explanation:** $H.M = \frac{2ab}{a+b}$ $H.M = \frac{2(2)(8)}{2+8}$ $H.M = \frac{16}{5}$
37)	**Option d.** **Explanation:** $G^2 = AH$ $\left(\sqrt{ab}\right)^2 = \left(\frac{a+b}{2}\right)\left(\frac{2ab}{a+b}\right)$ $ab = ab$ Also, A<G<H and A, G, H will be in GP. So, all of these are true.
38)	**Option d.** **Explanation:** In case of positive numbers, all the conditions from: • $G^2 = AH$ • A>G>H • A, G, H are in GPwill be true.
39)	**Option B. 1+4+9+16** Explanation: $\{n^2\}=1^2+2^2+3^2+4^2=1+4+9+16$ The series upto 4 terms is called fourth partial sum of$\{n^2\}$ Because variable in this polynomial have maximum power 2
40)	**Option A. $\frac{n}{2}[2a + (n-1)d]$** Explanation: By series Sum formula for finite series is $s_n=\frac{n}{2}[2a + (n-1)d]$
41)	**Option B. $\bar{\text{E}}$**

42)	**Option C. P(E)=1-P($\bar{E}$)**
43)	**Option B. 1/5** **Explanation:** S=10 N(E)=2 P(A)=n(E)/S=2/10=1/5
44)	**Option A:** $\sin^{-1}(A\sqrt{1-B^2}+B\sqrt{1-A^2})$ **Explanation:** By Fomula, $\sin^{-1} A+\sin^{-1} B = \sin^{-1}(A\sqrt{1-B^2}+B\sqrt{1-A^2})$
45)	**Option A:** $\left\{\frac{\pi}{4}+n\pi,\ \frac{5\pi}{4}+n\pi\right\}$ (Trick: value 1 is get on the angle of $\frac{\pi}{4}, \frac{5\pi}{4}$ and tan interval is $n\pi$)
46)	**Option A:** $\frac{\pi}{8}$ (Trick: -1 is get on the angle of $\frac{\pi}{8}$)
47)	**Option a. undefined** **Explanation:** $=\lim_{x\to a}\frac{x^3-a^3}{x-a}$ $=\frac{a^3-a^3}{a-a}$ $=\frac{0}{0}$ Hence undefined
48)	**Option B. $\theta+360^0\ k,\ k\in Z$**

49)	**Option B. 1** **Explanation :** It is trigonometric identity
50)	**Option A. 1 quad**
51)	**Option b: 54.6×10^{-8}m** **Explanation:** 546 nm= 546×10^{-9} $= 54.6 \times 10^{-8}$m.
52)	**Option b: 5732°** **Explanation:** 100rad X 180/ π = 5729.58
53)	**Option b: Right hand rule** **Explanation:** Because the direction of vector product is given by right hand rule that is the direction of the product vector is perpendicular to this plane. Rotate the first vector A into B through the smaller of the two possible angles and curl the fingers to the right hand. In the direction of rotation, keeping the thumb erect. The direction of the product vector will be along the erect thumb.
54)	**Option b: 54.6×10^{-8}m** **Explanation:** 546 nm= 546×10^{-9} $= 54.6 \times 10^{-8}$m
55)	**Option c: Coulomb** **Explanation:** Coulomb is derived unit for electric charge and in terms of based unit Is written as.
56)	**Option c: Sand**

	Explanation: SiO_2 is the formula of sand so we get silicon abundantly from sand.
57)	**Option c: 7** **Explanation:** Base units are 7.
58)	**Option b: Radian** **Explanation:** Radian is the plane angle between two radii of a circle which cut off circumference an arc; equal in length to the radios.
59)	**Option a: *(Kgm$_2$)*** Explanation: The amount of torque needed to cause any given angular acceleration (the rate of change in angular velocity) is proportional to the **moment of inertia** of the body. **Moment of inertia** may be **expressed** in units of kilogram meter squared (kg. m^2) in SI units and pound-foot-second squared (lbf. ... s^2) in imperial or US units.
60)	**Option d: (r×p)** Explanation: **Angular Momentum** for a Single Particle. ... Notice that this equation is equivalent to $l = rp \sin\theta$, where **p** is the linear **momentum** of the particle: a particle does not need to move in a circular path to possess **angular momentum**.
61)	**Option b: 2s** **Explanation:** $V_f = V_i + gt$ $0 = 19.6 - 9.8t$ $t = 19.6/9.8$ $t = 2s$
62)	**Option b: 4.9m** **Explanation:** $h = Vi^2/2g$

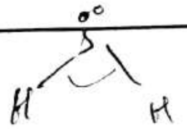
	$= (9.8)^2/2(9.8)$ $= 9.8/2 = 4.9$m
63)	**Option c: maximum height** **Explanation:** At height things are attracted by gravitation force going away from gravitational force. This field become strong and attract things that is why projectile speed is minimum.
64)	**Option C: at the point of projection**
65)	**Option a: distance**
66)	**Option c: elasticity** **Explanation:** The distances between molecules in solids are very small, i.e., solids are more dense as compared to liquids and gases. Because they are so close, than can collide very quickly, i.e. it takes less time for a molecule of the solid to 'bump' into its neighbor. Solids are packed together tighter than liquids and gases, hence sound travels fastest in solids. The distances in liquids are shorter than in gases, but longer than in solids. Liquids are more dense than gases, but less dense than solids, so sound travels 2nd fast in liquids. Gases are the slowest because they are the least dense: the molecules in gases are very far apart, compared with solids and liquids.
67)	**Option b: $\lambda/2$** **Explanation:** When a wave enters a different medium, its wavelength and speed change, but its frequency remains the same. ... From a crest to a trough is a distance of $\lambda/2$. A change of phase of 180° or π is equivalent to a path difference of $\lambda/2$.
68)	**Option d: 4.2×10^5 J** **Explanation:** $A = 0.2 + \mu g$ $= 0.6\ g$ $W = f \times d = mas$ $= (6000/9.8) \times 0.69 \times 1000$ $= \mathbf{4.2 \times 10^5\ J}$
69)	**Option d: 20 J**

	Explanation: W = Fd = 4 x 5 = 20 J
70)	**Option b: 2.5 x 10^5 J** **Explanation:** F = 5000N x 0.05 = 250N W = F x d = 250 x 1000 = 250000 J
71)	**Option c : 3 x 10^5 J** **Explanation:** A = 0.2 + 0.05 x 9.8 =0.69 W = F x d = mass = (6000 / 9.8) x 1000 = 3 x 10^5j
72)	**Option d: 4.2 x 10^5 J** **Explanation:** A = 0.2 + μg = 0.6 g W = f x d = mas - = (6000/ 9.8) x 0.69 x 1000 **= 4.2 x 10^5 J**
73)	**Option a: fo+fe** **Explanation:** .An astronomical telescope works on the principle that when an object to be mag. ... and an eye piece E. the focal length fo of the objective lens of astronomical telescope is ... whose position is adjusted so that the image lies between the focus *fe*'.
74)	**Option c: Greater than critical angel**

	Explanation: Total internal reflection is a phenomenon that occurs at the boundary between two mediums, such that if the incident angle in the first medium is greater than the critical angle, then all the light is reflected back into that medium.
75)	**Option B. (Light from sodium lamp)** **Explanation:** A sodium-vapor lamp is a gas-discharge lamp that uses sodium in an excited state to produce light at a characteristic wavelength near 589 nm. ... Low-pressure sodium lamps only give monochromatic yellow light and so inhibit color vision at night.
76)	**Option C. (Same wave length with constant phase difference)** **Explanation:** The source of light, which emit continuous light waves of same wavelength, same frequency and in same phase or having a constant phase difference are called coherent sources. Two coherent lights form a consistent image.
77)	**Option b : (Yellow light)** **Explanation:** When you burned the skewer tip coated with sodium chloride, you should have seen that the flame on the sodium chloride was pure yellow/orange (without any blue). This is because when the metal sodium is heated, it makes intense yellow/orange light.
78)	**Option b. (Consecutive Interference)** **Explanation:** When two waves meet in such a way that their crests line up together, then it's called constructive interference. The resulting wave has a higher amplitude. In destructive interference, the crest of one wave meets the trough of another, and the result is a lower total amplitude
79)	**Option B. (Light from sodium lamp)** **Explanation:** A sodium-vapor lamp is a gas-discharge lamp that uses sodium in an excited state to produce light at a characteristic wavelength near 589 nm. ... Low-pressure sodium lamps only give monochromatic yellow light and so inhibit color vision at night.
80)	**Option c: one forth**

	Explanation: If radius becomes half then r' = r/2 New Vt'=? Vt'/Vt = r'>2/r>2 By plugging in the value of r' in the above relation. Vt'/Vt = (r/2)>2/r>2 Vt'/Vt = 1/4 Vt' = Vt/4
81)	**Option b: Calcium state**
82)	**Option c: $2Ca+CO_2 \rightarrow 2CaO+C$**
83)	**Option a: Higher** **Explanation:** Alkaline earth metals have two valence electrons; therefore the nuclear charge is relatively greater than the alkali metals. Hence the volume becomes smaller. So the inter atomic forces become stronger, resulting in the high melting and boiling point.
84)	**Option c: Amphoteric** **Explanation:** an amphoteric compound is a molecule or ion that can react both as an acid and as a base. Many metals (such as copper, zinc, tin, lead, aluminium, andberyllium) form amphoteric oxides or hydroxides. Amphoterism depends on the oxidation states of the oxide. Al_2O_3 is an example of an amphoteric oxide.
85)	**Option a: $Ca(OH)_2$** **Explanation:** Calcium hydroxide (traditionally called slaked lime) is an inorganic compound with the chemical formula $Ca(OH)_2$. It is a colorless crystal or white powder and is obtained when calcium oxide (called *lime* or *quicklime*) is mixed, or slaked with water. It has many names including hydrated lime, caustic lime, builders' lime, slack lime, cal, or pickling lime. Calcium hydroxide is used in many applications, including food preparation, where it has been identified as E number E526. Limewater is the common name for a saturated solution of calcium

	hydroxide.
86)	**Option c** **Explanation:** Because it is inversely proportional to atomic size and shielding effect. As the atomic size and shielding effect increase down the group, there will be small attraction between electron and nucleus due to large distance.
87)	**Option a** **Explanation:** Orthoboric acid is a colorless solid. It is slightly soluble in water and its solubility at 100 centigrade is 34 gm/100 gm of H20.
88)	**Option b** **Explanation:** Generally carbon compounds do not conduct electricity because they do notcontain free electrons because carbon is capable of forming many allotropes due to its valency. Well-known forms of carbon include diamond and graphite.
89)	**Option d** **Explanation:** Because it is physically greasy to touch. Therefore it is used in making cosmetics. It is also used in making household articles.
90)	**Option a** **Explanation:** A *covalent bond*, also called a molecular *bond*, is a chemical *bond* that involves the sharing of electron pairs between atoms. These electron pairs are known as shared pairs or *bonding* pairs, and the stable balance of attractive and repulsive forces between atoms, when they share electrons, is known as *covalent bonding*.
91)	**Option a** **Explanation:** Bond strength decreases with increase in the size of halogen.
92)	**Option a**

	Explanation: Iodine is usually used in an alcohol solution (called tincture of iodine) or as Lugol's iodine solution as a pre- and postoperative antiseptic. Some people do not recommend disinfecting minor wounds with iodine because of concern that it may induce scar tissue formation and increase healing time. However, concentrations of 1% iodine or less have not been shown to increase healing time and are not otherwise distinguishable from treatment with saline. Novel iodine antiseptics containing povidone-iodine (an iodophor, complex of povidone. a water-soluble polymer, with triiodide anions I_3^-, containing about 10% of active iodine) are far better tolerated, do not negatively affect wound healing, and leave a deposit of active iodine, thereby creating the so-called "remnant", or persistent, effect. The great advantage of iodine antiseptics is their wide scope of antimicrobial activity, killing all principal pathogens and, given enough time, even spores, which are considered to be the most difficult form of microorganisms to be inactivated by disinfectants and antiseptics.
93)	**Option c** **Explanation:** it is polymorphic because all the elements of oxygen family exist in more than one form.
94)	**Option b**  **Explanation:** because sp^3 and two loan pairs occupy vertices of pyramidal structure.
95)	**Option b** **Explanation:** $2KMnO_4+3H_2SO_4+5H_2S \rightarrow K_2SO_4+H_2O+2MnSO_4$
96)	**Option c** **Explanation:** It is also called as hypo. $NaSO_3+S \rightarrow Na_2S_2O_3$
97)	**Option b** **Explanation**: Arenes are insoluble in water and hence they are non-polar

	compounds.
98)	Option b **Explanation:** Hydration of alkene is electrophilic addition of H_2O to alkenes which forms alcohol not alkyl halides.
99)	**Option a**
100)	**Option a Option a** **Explanation:** The reaction of iodine and base with methyl ketones is called the iodoform test (the appearance of a yellow precipitate) is used to probe the presence of a methyl ketone. This is also the case when testing for specific secondary alcohols containing at least one methyl group in alpha-position.

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